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CONTENTS

	Page
1. <i>New Light on the History of Bengal</i> .. By DR. R. C. MAJUMDAR	1
2. <i>Members of a Medieval Brāhmaṇa Family ruling in Gaya and Their Religious Activities</i> .. By SRIMATI RAMA CHATTERJEE	7
3. <i>A Study of Some Graha Images of India and Their Possible Bearing on the Nava-Devās of Cambodia</i> .. By MRS. DEBALA MITRA	13
4. <i>Phonemes of a Dacca Dialect of Eastern Bengali and the Importance of Tone</i> .. By SRI ANIMESH KANTI PAL	39
5. <i>Indian Botany in Retrospect with Particular Reference to Algal Systematics</i> .. By DR. K. S. SRINIVASAN	49
6. <i>Sankar-Madhava at Kunda, District Jabalpur</i> .. By MRS. DEBALA MITRA	79
7. <i>Elliptical Structures in Ancient India</i> .. By SRI H. SARKAR	83
8. <i>Rare and Unique Antiquities from Rajghat</i> .. By SRI ADRISS BANERJI	89
9. <i>Ambā-Nana-Durgā</i> By SRIMATI BANDANA SARASWATI	95
10. <i>Monuments of Bijolyā</i> .. By SRI ADRISS BANERJI	99
11. <i>Reviews of Books</i> —	
(a) <i>A History of the Patna College</i> .. By DR. A. BANERJI-SASTRI	107
(b) <i>An Anthology of Sanskrit Court Poetry : Vidyā-kara's Subhāṣitaratnakōṣa</i> .. By DR. A. BANERJI-SASTRI	107
(c) <i>Études Védiques et Pāṇiniannes</i> .. By DR. A. BANERJI-SASTRI	108
(d) <i>Selections from Ochterlony Papers</i> .. By DR. R. C. MAJUMDAR	109
(e) <i>Itkal University History of Orissa</i> .. By DR. D. C. SIRCAR	110

NEW LIGHT ON THE HISTORY OF BENGAL

By R. C. MAJUMDAR

The recent discovery of five new copperplate grants¹ of kings belonging to the Candra dynasty has illumined a dark chapter in the history of ancient Bengal. The names of four kings of this dynasty were known and two of them Trailokyacandra and his son Śricandra, were powerful kings ruling in Harikela and Candradvipa. But nothing more was known about them and their connection, if any, with two other kings, Layaha (or Ladaha)-candra and Govindacandra, who ruled over the same region.² Now we not only know that these two kings belonged to the same royal family but are in a position to give a complete genealogy and approximate chronology of the seven rulers of this family and notable achievements of some of them.

The following table is drawn up on the basis of the data supplied by the new records taken along with others previously known:

	<i>Maximum regnal year known</i>	<i>Approximate date (A.D.)</i>
Pūrnacandra		
Suvarmacandra		
Trailokyacandra		875-905
Śricandra . . .	44 (46)	905-935
Kalyānacandra		935-955
Ladahacandra		985-1010
Govindacandra	23	1010-1035

The approximate dates suggested above are based on the fact that the last king, Govindacandra, was defeated by a Cola general some time before

¹ The plates:

(1) Pashumbhing Plate of Śricandra year 5.
(2) Dacea Plate of Kalyānacandra, year 24.
(3-4) Two Manavati Plates of Ladahacandra (not Layaha-candra as read in his Bharhut Image Inscription, *Epi. Ind.*, XVII, p. 349)
(5) Manavati Plate of Govindacandra

These plates are referred to in the text by their numbers. No. 1 was published by Mr. Kamalakanta Gupta of Sylhet.

Nos. 2 to 5 were discussed by A. H. Dani (*Via Proceeding of the Indian History Congress*, 23rd Session, Aligarh, 1960, Part I, pp. 36-44), and Dr. D. C. Sircar (*Journal of Indian History*, XLII, pp. 661-666, and *Sāhitya Parigat Patrikā*, Vol. 67, pp. 1-7). In this article Dr. Sircar refers to Trailokyacandra as son of Pūrnacandra, which is obviously an oversight. Trailokyacandra was the son of Suvarmacandra and grand-son of Pūrnacandra).

It is a great pity that these very important inscriptions have not been edited up to now. Nevertheless, Professor Dani has rendered a great service by discussing the contents and historical importance of these inscriptions.

² Cf. *History of Bengal*, Vol. I, edited by R. C. Majumdar and published by the University of Dacca in 1943 (hereafter referred to as *H.B.*), pp. 191-197. It gives a list of the inscriptions of the Candra kings known till then.

³ The date of the Madanpur Plate of Śricandra was read as 44 by Dr. R. G. Buhak (*Epi. Ind.*, XXVIII, p. 51) but Dr. D. C. Sircar reads the date as 46 (*ibid.*, p. 337).

A.D. 1017 and the Varmanas had ousted the Candras before c. A.D. 1040¹. The other dates are calculated on the basis of the known length of each reign. No dates are suggested for the first two rulers, of whom practically nothing is known and who are not likely to have wielded much power. This chronological scheme may be provisionally accepted with a margin of error of about 10 to 20 years. It gives an average of 32 years for each generation, i.e. three generations for a century.

Among the achievements of these kings, as recorded in the newly discovered grants, the following deserve special mention:

1. Trailokyacandra was a great ruler and defeated the Gaudas (Nos. 2-4).
2. Śricandra's kingdom included the region round Sylhet (No. 1).
3. Śricandra defeated the rulers of Gauda and Prāgjyotiṣa (No. 3), reinstated Gopāla (on the throne) and restored the captive Pāla queen (No. 2).²
4. Kalyānacandra defeated the Mlechhas on the Lauhitya river as well as the Gaudas (Nos. 3, 4, 5).

Keeping in view the chronological scheme suggested above, the information supplied by the new records may be discussed under a few broad headings.

1. GAUPA

It would appear that war was intermittently carried on between the Candras and the Gaudas during the first half of the tenth century. Professor Dani and Dr. D. C. Sircar have accepted without question the normal interpretation that the rulers of Gauda refer to the Pāla kings. But both have ignored one other possibility. It is a well-known fact that kings of

¹ Professor Dani places the reign-period of Govindacandra between 1020 and 1050. His view is based mainly on the statement of the author of the *Subda-pradīpa* that his father served Rāmapāla, Lord of Vanga (*Vaigīśvara*), and his grandfather served Govindacandra as a court physician. Dani identifies those two kings, respectively, with Rāmapāla of the Pāla dynasty and Govindacandra of the Candra dynasty, and naturally concludes that there was probably not more than a generation's gap between them. But from what we know of the history of Rāmapāla he could not have possibly asserted his sovereignty over Vanga till long after the Varmanas had occupied the country, presumably after defeating Govindacandra or his successor. There are good grounds for the belief that the Varmanas were in occupation of East Bengal some time before A.D. 1048 (*H.B.*, p. 200). Jātavarman, the first or second king of this dynasty, was a contemporary of Rāmapāla's father, Vigrahapāla, and Bhojavarman, Jātavarman's grandson and second in succession after him, who used full imperial titles, had his capital at Vikramapura, the capital of the Candras. So Rāmapāla, Lord of Vanga, could not be entitled to this epithet till more than one or two generations after Govindacandra. The date suggested above by me for Govindacandra is, therefore, more in consonance with the known facts of the rule of the Varmanas in the territory of the Candras. King Rāmapāla, mentioned in the *Subda-pradīpa*, was perhaps a local ruler like Dharmapāla of Dāṇḍabhukti who was defeated, like Govindacandra, by the Colas. It is interesting to note in this connection that the kings of the Kāmboja family, who also ruled over Dāṇḍabhukti, bore well-known names of the imperial Pāla family.

The commencement of the reign of Candradeva cannot be A.D. 1020, as Professor Dani suggested and Dr. D. C. Sircar accepted, for the Cola expedition to Bengal is referred to in the Tiruvālangādu Plates dated in the 6th year of Rājendra Cola, i.e. A.D. 1017.

² Professor Dani takes a verse in No. 2 to mean that Śricandra helped Gopāla to recover his throne by removing the obstacle created by Prithvipāla and suggests that Gopāla and Prithvipāla were brothers who fought among themselves. Even assuming that Prithvipāla was a person and not used as a synonym for 'king', it would be more reasonable to take him to be a ruler of the Kāmboja family, for, as mentioned above, the names of its kings ended in Pāla. But none of these two conjectures is supported by any evidence.

the Kāmboja family ruling over North and West Bengal during the tenth century called themselves 'Lords of Gauda'.¹ As Gauda was, strictly speaking and originally, the name of this region (though later it denoted the whole of Bengal), the Kāmboja claim was fully justified. That the Candras fought with the Kāmbojas rather than with the Pālas receives some support from the fact that Śricandra restored Gopāla to his throne. This Gopāla was undoubtedly Gopāla II of the Pāla dynasty who ruled from c. A.D. 940 to 960 and was, therefore, a contemporary of Śricandra. It is a reasonable assumption that Gopāla II was deprived of his kingdom (or a part of it) by the Gauda lord of Kāmboja dynasty and Śricandra defeated him and restored the Pāla king to his kingdom. Of course, it is also not unlikely that Śricandra himself defeated the Pāla king and then restored his kingdom to him. But in view of the fact that Gauda was at that time actually in possession of the Kāmboja family and the Candras are said to have fought the Gaudas, the first hypothesis seems to be more reasonable.² In any case this possibility must be kept in view so long as there is no positive evidence of the conflict between the Candras and the Pālas.

2. POLITICAL STATUS OF THE CANDRA RULERS

Ever since the discovery of the Rampal copperplate of Śricandra there has been a keen controversy about the political status of Trailokyacandra, for it was indicated in the above plate by a somewhat peculiar phrase, viz. *ādhāro Harikela-rāja-cchatrasmitānām śriyām yaś-candropapade babhūva nripatir-dvīpe Dilipomah*. In the *History of Bengal*, I wrote in 1943: 'This phrase has been differently interpreted. Dr. Basak takes it to mean "the support of the royal majesty smiling in the royal umbrella of the king of Harikela". Mr. N. G. Majumdar translates it as "the support of Fortune Goddesses (of other kings) smiling at (i.e. joyful on account of) the umbrella which was the royal insignia of the king of Harikela": According to the first interpretation, Trailokyacandra was the *de facto*, if not *de jure*, ruler of Harikela, while according to the second he was both *de facto* and *de jure* king of Harikela, with a number of other rulers subordinate to him. The latter view seems to be preferable. Thus Trailokyacandra added Candradvipa and Harikela to his paternal dominions and felt justified in assuming the title *Mahārājādhira*'.³

Fifteen years later Dr. Basak edited the Madanpur Plate of Śricandra dated year 44 (corrected to 46 by Dr. D. C. Sircar). It is evident that Dr. Basak now held the view propounded by me in the passage quoted above, for he observes⁴: 'The net result of the political achievements of Trailokyacandra seems to be that he was at first a king of Candradvipa but later became the ruler over the whole of Harikela'. In his comments on the article of Dr. Basak, Dr. D. C. Sircar observes: 'The real import of the passage in question has escaped the notice of all the three scholars referred to above (i.e. Dr. Basak, N. G. Majumdar and myself). He interprets the passage to mean that "the Candra king Trailokyacandra of Candradvipa was a feudatory or ally of the king of the Harikela country."⁵ Two years later, he further elucidated his views in the following passage: "It appears that the Candras of Rohitāgiri were originally the feudatories of

¹ For the rulers of the Kāmboja family, cf. *H.B.*, p. 133.

² Cf. f.n.² on p. 2.

³ *H.B.*, p. 195.

⁴ *Epi. Ind.*, XXVIII, p. 54.

⁵ *Ibid.*, p. 338.

the Pāla kings of Bengal and Bihar and that one of the Candra princes came to Bengal in connection with his services under the Pāla master. But Trailokyacandra seems to have transferred his allegiance to the king of Harikela and was rewarded by the Viceroyalty of Candradvipa."¹ These series of suppositions are not supported by any positive evidence. But what is strange is that after the publication of the new copperplates, referred to above, Dr. Sircar sticks to this view and says that the new data supplied by them is not inconsistent with his theory that both Trailokyacandra and Śricandra were subordinate allies (*laghumitra*) or feudatories, respectively, of the king of Harikela and of the Pālas.

If we regard the Gaudas mentioned in the Candra records as referring to the Pālas, we must assume that there was constant conflict between the Chandras and the Pālas in which the former scored greater success. Strangely enough, even though Dr. Sircar takes the Gaudas to mean the Pāla rulers, he still argues that Trailokyacandra might have fought against them successfully as a feudatory or *laghumitra* of the Harikela kingdom. Even stranger still is his belief that Śricandra became the feudatory or *laghumitra* of the Pālas.² Comment is needless on such attempts to support one's old theory at any cost—in face of facts and data which, on any reasonable construction, repudiate it.³

But even if we take the Gaudas to refer to Kāmboja rulers, the newly-discovered records of the Candra rulers certainly indicate that Trailokyacandra and his successors were not only independent but very powerful kings who fought successfully against the Kāmboja rulers for a long period and were in a position to boast that even a Pāla king owed his throne and the release of his queen from captivity to one of them. Besides, Śricandra and his three successors call themselves *Paramesvara*, *Paramabhattāraka* and *Mahārājādhirāja* in their own grants and refer to the preceding king as *Mahārājādhirāja*.

We do not possess any grant of Trailokyacandra but he is referred to as *Mahārājādhirāja* in the grant of his son, Śricandra. It is, therefore, certain that Śricandra and his three successors certainly, and Trailokyacandra probably, assumed full imperial titles. This fact, taken along with the others supplied by the newly-discovered records, seems to be conclusive on the point that the Chandras, from the time of Trailokyacandra, were independent rulers of South and East Bengal, known as Vaṅgāla.

3. POLITICAL CONDITION OF BENGAL IN THE TENTH CENTURY

The Candella ruler Yaśovarman claims in his records to have routed the Gaudas, and his son, Dhāngadeva, is said to have defeated the rulers of Āṅga and Rādhā. The Kalacuri king, Yuvarāja, is said to have defeated the king of Gauda, and his son, Laksmanarāja, invaded Vaṅgāla. All these kings ruled in the tenth century.⁴ It would thus appear that there were at this time at least three independent kingdoms in Bengal proper, namely Gauda, Rādhā and Vaṅgāla, in addition to Āṅga which presumably refers to the Pāla kingdom. It would be quite a reasonable inference from what has been stated above that Gauda denotes the Kāmboja, and Vaṅgāla the Candra kingdom. Rādhā was at one time included in the Kāmboja

¹ *Epi. Ind.*, XXXIII, p. 135.

² *Sāhitya Parīṣat Patrikā*, Vol. 67, pp. 3, 5.

³ It is hardly necessary to add that Professor Dani who brought these inscriptions to light holds the same view of the power and status of the Candra kings as I have stated above.

⁴ *H.B.*, pp. 132 ff.

kingdom as the Kāmboja king, Nayapāla, who assumed full imperial titles and granted land in the Vardhamāna-bhukti. Most probably these territories were lost by the Pālas during the disasters that befell the Pāla kingdom during the reign of Nārāyanapāla towards the end of the ninth and the beginning of the tenth century A.D. Evidently the Pāla kings, Rājyapāla (A.D. 908–940) and Gopāla II (A.D. 940–960), who followed Nārāyanapāla strove hard to maintain or recover their kingdom or portions of it. Hence there followed a prolonged struggle between the Pālas, Kāmbojas and Candras in course of which territories probably changed hands and alliance was shifted from time to time. This satisfactorily explains the sovereignty exercised by the Pāla king, Rājyapāla, in North Bengal¹ and Gopāla II in portions of North and East Bengal² during the period when the Kāmbojas were rulers of Gauda and the Candras were rulers of Vāngāla. As rulers of both these dynasties assumed full imperial titles, it would be unreasonable to assume that the two Pāla kings mentioned above exercised uninterrupted sway over any considerable portion of North or East Bengal. Such a hypothesis would also go against the mention of several kingdoms in Bengal proper in the records of the Kalacuris and the Candellas.

4. RECOVERY OF THE LOST ANCESTRAL KINGDOM BY MAHIPĀLA I

According to verse 12 of the Bangarh grant of Mahipāla I, he succeeded, by defeating his adversaries in battles, in recovering his paternal (*pitryam*) kingdom which had passed into the hands of those who had no claim to it (*anadhikrita-vilupta*). As the Kāmbojas were in possession of North Bengal, which has been described as the ancestral home (*janaka-bhūmī*) of the Pālas in the *Rāmacarita*, it was generally accepted that Mahipāla I reconquered North Bengal after ousting the Kāmbojas. But now that we know that another portion of the Pāla kingdom, viz. Vāngāla, was for long in the possession of the Candras, we need not be quite so sure that the paternal kingdom recovered by Mahipāla refers to North Bengal. For though this region was the ancestral *home*, Vāngāla has greater claim to be regarded as the paternal or ancestral *kingdom*. According to Tāranātha, Gopāla, the founder of the Pāla dynasty, was born in North Bengal but first became ruler of Bhaṅgala. This view is supported by the fact that Dharmapāla, the son of Gopāla, though styled Gaudeśvara, is referred to as ruler of Vāngāla in the Nausari grant of the Rāstrakuta king, Govinda III, and Lord of Vāngāla in the Gwalior Praśasti of Bhoja. If we accept the view that Vāngāla was the ancestral kingdom of the Pālas, the usurpers from whom Mahipāla recovered it might be more reasonably taken to be the Candras. If we accept the date of the Bangarh grant to be 9 (as read by R. D. Banerji, though pronounced to be scratched out by Akshay-kumar Maitreya and other previous editors),³ Mahipāla must have defeated Lada-hacandra and established his sovereignty over at least a part of East Bengal. This is directly proved by two image inscriptions dated in the years 3 and 4 of Mahipāla⁴ and indirectly by the fact that, unlike his predecessors, no Lada-hacandra is not credited with any military success even in his own

¹ Bhaturiya Inscription (*Epi. Ind.*, XXXIII, p. 150).

² Mandhuk Inscription (*I.H.Q.*, XXVIII, p. 55) and Jajilpara grant (*J.A.S.*, XVII, p. 137).

³ *Epi. Ind.*, XIV, p. 324.

⁴ Professor Dani, following Dr. D. C. Sircar, holds that this Mahipāla might be Mahipāla II mentioned in the Baghaura (*Epi. Ind.*, XVII, p. 355) and Narayanpur (*Indian Culture*, IX, p. 121) Image Inscriptions, dated respectively in the years 3 and 4, and who is generally taken to be Mahipāla I might be Mahipāla II.

grants. But an image inscription of Ladahacandra in the same region dated in his 18th regnal year¹ shows that the Candras had recovered that region.

5. KĀMARŪPA

We learn from the newly-discovered plates that the Candras had hostile relations not only with the Gaudas but also with Kāmarūpa. Śricandra's army entered the valley of the Lauhitya (Brahmaputra) in order to conquer Kāmarūpa and evidently reached the interior of the country. He is also said to have defeated the king of Prāgjyotisa.

Kalyānacandra, the son of Śricandra, is also said to have defeated the Mlecchas who lived on the Lauhitya river.

Kāmarūpa was ruled in the tenth century by kings of the dynasty founded by Prālambha, who probably belonged to the dynasty of the Mleccha Sālastambha, though according to some records he belonged to the dynasty founded by Asura Naraka, the mythological founder of the early royal dynasty of Kāmarūpa, to which belonged Bhāskaravarman. The specific reference in the Candra plates to the Mleccha ruler of Kāmarūpa supports the view that the ruling kings belonged to the dynasty of Sālastambha. But towards the close of the tenth century A.D. there was a change of dynasty as well as of the capital of the kingdom from Tezpur or its neighbourhood to Gauhati, the original capital of Kāmarūpa. Whether these were due in any way to the invasion of the Candras cannot be determined.

¹ *Epi. Ind.*, XVII, pp. 349 ff.

MEMBERS OF A MEDIEVAL BRĀHMAÑA FAMILY
RULING IN GAYĀ, AND THEIR RELIGIOUS
ACTIVITIES

By RAMA CHATTERJEE

In Northern India, Gayā achieved a unique place among the holy lands of the Hindus. Four inscriptions in that sacred *tīrtha* were discovered which throw interesting light on the contemporary religious condition of the locality. Three of them, Narasimha Temple Inscription, Kṛishṇa-dvārikā Temple Inscription and Akshayavata Inscription, belong to one Viśvāditya Viśvarūpa; the fourth, Sitalā Temple Inscription, is a *prāśasti* of his son, Srimān Yakshapāla. Another inscription engraved on the pedestal of the image of Gadādhara was found there, of which only four lines and a half could be read. Verses 2 to 4 of the last are similar to verses 2 to 4 of the Narasimha *prāśasti*. So both these inscriptions belonging to Viśvarūpa seem to have been composed by the same author, Vaidya Vajrapāni. All these inscriptions record in detail the religious activities of a Brāhmaṇa dynasty which appears to have ruled over Gayā in the middle of the eleventh century A.D.

Of the first three *prāśastis* of Viśvarūpa, the Narasimha and Kṛishṇa-dvārikā ones are dated in the fifteenth regnal year of the Pāla Emperor, Nayapāladeva. The third one, Akshayavata *prāśasti*, mentions the fifth year of the reigning monarch, Vigrahapāla III. The fragmentary inscription seems to be contemporaneous with the Narasimha *prāśasti*, and may be attributed to Nayapāla's time. Thus Viśvarūpa began his rule at Gayā as a feudatory of Nayapāla and continued it up to the beginning of Vigrahapāla III's reign. The Sitalā Temple Inscription of Yakshapāla bears no date of the Pāla period; this may imply his independent rule. But he and his father, Viśvarūpa, have been described as 'Nṛipa' and 'Narendra' in this *prāśasti*. Yakshapāla might have thrown off the Pāla yoke at the period of anarchy during Vigrahapāla III, Mahipāla II and others, but no date of his own as an independent ruler is recorded in his inscription. Moreover, words like 'Nṛipa' and 'Narendra', applicable even to the small landholders, may not prove his independent rule.¹

In the Gayā Kṛishṇa-dvārikā *prāśasti*, Viśvarūpa's grandfather, Paritosh, has been mentioned as a rich person, a match for Mahādeva and as an abode of three qualities (*Dharma*, *Artha* and *Kāma*), from whom the dynasty began. But none of these inscriptions refers to him as a ruler of Gayādhāma. The prowess of his son, Śūdraka, as a protector of Gayā, referred to in the Narasimha Temple Inscription, presents him as the first ruler of this holy land. It was he who was honoured with the insignia of a ruler (marks of sandal paste on forehead) by the King of Gauda.² This indicates that he became the local ruler of Gayā under the protégé of the contemporary Pāla monarch.

As regards the family of Paritosh, the Kṛishṇa-dvārikā *prāśasti* endows it with the epithet *Mahādvijarājavamśa*. M. Chakravarty suggests that this dynasty belonged to a low-class Brāhmaṇa order. A. K. Maitreya, however, takes him to have been a great Brāhmaṇa of social standing. Referring to

¹ *Epi. Ind.*, Vol. XXXVI, p. 82.
² *Ibid.*

these divergent opinions about the status of the family, Dr. D. C. Sircar says : 'This difference is based on the different interpretations of the expression "Mahāvijarājavamśa".' Dr. Sircar himself appears to have accepted the idea of giving the members of the dynasty the status of Agradāni Brāhmaṇas in Bengal. In support of his view he quotes from the grammarian's tradition as well (cf. *Mahādvija*). He puts down in support of this view that no member of this family is described in any of these inscriptions as well-versed in the Vedic studies. The Krishna-dvārikā *prāśasti* endows Paritosh with the expression 'Dvijarāja-śekhara'. Dr. Sircar comments on this that the compound may either mean 'the best of the Brāhmaṇas', or it may signify 'one who is highly respectful towards the Brāhmaṇas'. Thus he takes them as Gayāl Brāhmaṇas who are directed to live on the gifts presented in the Śrāddha ceremonies.¹

According to the oft-quoted extract, 'Sankhe taile tathā māmse vaidye jyautishike dvije yātrāyām pathi nindrāyām mahach-chabdo na dīyate', the word 'Mahādvija' means a Brāhmaṇa of a very low order, as low as a Chandāla. Śāringarava in Kālidāsa's drama Śakuntalā addresses the royal priest as 'Bho Mahābrāhmaṇa' (Act V). This indicates a degraded sense. In the Krishna-dvārika record the word 'Mahādvija' is a part of the compound of the expression 'Mahāvijarājavamśa'. It can be split up as *dvijānām rājā-dvija-rājah, tasya varṇāḥ-dvijarājavamśah; mahāṁśchāsau dvijarājavamśāścheti mahāvijarājavamśa*. In such a way his family may be taken to belong to the rank of the best Brāhmaṇas. In Narasiṁha *prāśasti* the appellation 'dvijarājavarya' has been applied to both Paritosh and Garuḍa (Vishṇu's mount). This in case of Paritosh may bear the sense, even according to Dr. Sircar, 'the best among the Brāhmaṇas in the front rank'.² This sort of reasoning may indicate that the Brāhmaṇin family was not of a very low social order. Propagation of Brāhmaṇical religion throughout Gayā by installing images of various deities was their best achievement. They devoted themselves to pious activities and also to the welfare of mankind.

The contemporary Gayādhāma of Viśvarūpa is described in the record as a sacred *tīrtha* of the Hindus. Gayāpuri similar to Brahmapuri, being the highest creation of Prajāpati Brahmā, was an open door to salvation. This is also stated in the Gayāmāhātmya of the *Vāyu Purāna*, 'Gayāpurīti manūmnā khyātā brahmapuri yathā'. The *purāna* also states that Gayārāja prayed to Vishṇu and other deities. Brāhmaṇas of that holy place were famous as supreme conductors of both the Vedic rites and Vedic studies. Among the loud chanting of the Vedas, people could hardly hear the words distinctly. Being afraid of Kali-age, righteousness (*Dharma*) had to conceal itself amidst the dense clouds of smoke raised from the sacrificial fires. So it was the Brāhmaṇas of Gayā who preserved the *Dharma* through the practice of Vedic rites. Refraining from the enjoyment of the objects of senses, each one of them was similar to Brahmā (Krishna-dvārikā *prāśasti* = 1 2). A partly similar idea is found in the *Vāyu purāna*, verse 106, 84 : *Lokāḥ punyagayāyām ye śrāddhino brahmalo-kagāḥ yushmān ye pūjayishyanti tairaham pūjitaḥ sadā*. The Narasiṁha Temple Inscription also supports the view that the status of the Brāhmaṇas was high, for it was they who caused people to perform the Śrāddha rites. The verse there runs:

*Brūmāḥ kiñcha bhavantī yatra pitarah pretālayavāsināḥ |
Pādasprishṭa jalapradāna vidhinā nākāṅganā nāyakāḥ .*

¹ *Epi. Ind.*, Vol. XXXVI, pp. 83-84.

² *Ibid.*, p. 86.

The religious texts like the *Rāmāyana*, the *Mahābhārata* and the *Smritis* also have preserved their injunctions that funeral obsequies for the deceased ancestors performed in this land propitiate them and lead them to eternal heaven.

Vaishnavism was the principal religion of Gayākshetra, and the most adorable deity was the Gadādhara aspect of Vishnu. Besides this, images of Janārddana and Nārāyaṇa were worshipped there. That is why Beni Madhab Barua says, 'Vishnu figures in the holy land of Gayā in four different aspects : (i) the Gadādhara or terrible, (ii) Janārddana or mild, (iii) Nārāyaṇa or awe-inspiring and (iv) Pūndarikāksha or beautiful, the first aspect getting predominance over the rest'.¹ Of the *prāśastis* of Viśvarūpa the Narasimha and Kṛishṇa-dvārikā ones were engraved during the occasion of the enshrinement of the images of the Gadādhara and the Janārddana aspects of Vishnu. The Akshayavata record bears the evidence of the installation of another image of Gadādhara and Sujanārddana along with those of other deities. In the Sitalā Temple Inscription, Yakshapāla, who is stated to have erected a temple for housing the image of different deities, installed one image of Nārāyaṇa among them. Moreover we know of Viśvarūpa as having decked the city of Gayā with many lofty shrines of Vishnu. But the first two *prāśastis* themselves appear to have been composed during the period to commemorate the sanctuaries of Gadādhara and Janārddana; this emphasizes their superiority over the other aspects of Vishnu. Thus Viśvarūpa was most probably a worshipper of the Gadādhara and Janārddana aspects of Vishnu, the most venerable deities of Gayākshetra.

All the members of this family seem to have been devotees of Vishnu. Viśvarūpa himself is introduced in the Narasimha record as similar to the Viśvarūpa form of Vishnu—'viśvāpakāraka nirākṛitaye = vatīrūpa Śrī viśvarūpa iti kīrtita viśvarūpah'. This partially reminds us of the *Gītā* verse 'paritrāṇāya sādhunām vināśaya cha dushkrītām; Dharmma samsthāpanārthāya sambhavāmi yuge yuge'. Moreover we find from the Kṛishṇa-dvārikā Inscription an equation of Viśvarūpa's father, Śūdraka, with Murāri, while Śūdraka's father, Paritosha, in Narasimha *prāśasti* has been described as a parallel to Garuḍa. Both of them again have been described as *achyutapādasevī* (worshipper of the feet of Vishnu). Baruā declares that Gayā-māhātmya of the Purāṇa shows three strata of Vishnu worship in Gayā : (i) *Avyakta*, (ii) *Vyaktivakta* and (iii) *Vyakta*. It is this last phase of worship when images of favourite gods came into existence throughout Gayā *tīrtha*. According to him, 'These three stages of manifestation of the existence of the deity of Gayā may be historically interpreted as indicative of three successive periods of the life of Gayā as the holy land of the Hindus'.² This inference appears also to be borne out by the several inscriptions noted above.

Siva was also an object of worship there. Among the images mentioned in the Akshayavata epigraph, Vateśa and Gangeśa probably indicate two Sivalingas. Arddhāṅgīna of Yakshapāla's inscription seems to refer to an image of Arddhanārīśvara. Sahasralīṅga, two Someśvaras and Kedāresvara mentioned in it may also refer to so many phallic emblems of Mahādeva. Installation of all these images proves that the worship of Siva in Gayādhāma in his phallic form was popular in those days, for all the Siva icons housed there were phallic emblems, save one—the exception was an

¹ Beni Madhab Barua's *Gaya and Bodh-Gaya*, Vol. I, p. 19.

² *Ibid.*, p. 59.

Arddhanārīśvara image, the composite androgynous figure of Mahādeva and Pārvati.

Such expressions as Kanakeśvara and Ambujabhava in the Akshayavāta record may probably be taken to refer to the two images of Brahmā. Dr. D. C. Sircar is inclined to recognize Parapitāmaheśvara of verse seventeen of the Akshayavāta *prāśasti* as Brahmā; all the words, Gātheśa, Kanakeśvara, Ambujabhava, occurring there according to him refer to the images of the same God.¹ But S. K. Saraswati and K. C. Sarkar take Parapitāmaheśvara and Vateśa as two Śivalingas.² If we accept the latter view, the Parapitāmaheśvara might also indicate the phallic emblem of Siva. These Siva temples are present even today near the Akshayavāta.

Few other deities of Akshayavāta, record not identified, are known by their names such as Gātheśa, Viśvarūpeśvara, Śukla-bhānu and Griddhreśa. Griddhreśa may be identified with an image of Garuda; Viśvarūpeśvara was probably a phallic emblem of Mahādeva after the name of its donor Viśvarūpa, thus falling under the category of a Svākshyaliṅga or Svanāma-liṅga. Installation of a 'Kamalā' image referred to in Yakshapāla's *prāśasti* may show that Lakshmi was worshipped in separate images during the period. Phalgunātha, Maunāditya and Vijayāditya are the three deities not apparently recognizable. Maunāditya and Vijayāditya, according to Dr. D. C. Sircar, are probably a couple of Sūrya images. The bank of the river Phalgu and the ground around the eternal banyan tree were known as sacred places. So Phalgunātha may signify a Śivalinga, possibly the presiding deity of the river Phalgu. No reference to a Sūrya image has been found in the inscription of Viśvarūpa except the mention of one Śuklabhānu. But one fragmentary inscribed slab beneath the image of Gadādhara begins with an obeisance to and invocation of the Lord Sūrya. It may be that this inscription had been engraved during the time of the construction of a temple of the Sun-God.³ Record of Yakshapāla, too, introduces a benediction to this God. Thus these epigraphic records appear to establish the prevalence of the worship of several Brahmanical deities like Vishnu, Siva and Surya.

Absence of any mention of Śakti worship in these *prāśastis* is of great interest. Reference to the installation of Devī-images is not found, except to that of Kamalā. It will be of interest to note in this connection that the composer of Krishṇa-dvārikā *prāśasti* probably refers to Tāntric mysticism in describing Paritosha's family as the roofless shelter of Mahānilasarasvatī⁴ (a form of Tārā, who endows a person with the power of good speech). The locality around the undying banyan tree had been sanctified as a place of pilgrimage by the very existence of all these temples. Siva Vateśa of the Akshayavāta Inscription may refer to the presiding deity of this tree-shrine.

The temples of different gods built by the family of Viśvarūpa satisfied the various religious needs of the people. But acts of piety like excavating tanks, making gifts of free food, etc., became their regular activities for the welfare of man. A tank named 'Uttaramānasā' and a free feeding-house (Satra-Dharmaśālā or Pānthaśālā) of Yakshapāla bear the evidence of such pious work. It thus proves that the pious activities of the local ruling family enhanced the importance of Gayādhāma amidst the Hindu

¹ *Epi. Ind.*, Vol. XXXVI, p. 89.

² S. K. Saraswati and K. C. Sarkar's *Kurkhar, Gaya and Bodh-Gaya*, p. 50.

³ *Epi. Ind.*, Vol. XXXVI, p. 88.

⁴ P. C. Bagchi, *History of Bengal*, Vol. I, Chap. XIII., p. 407.

Tirthas during the period of their Pāla overlords, Nayapāla and Vigraha-pāla III.

We know that the early Pāla kings, Dharmapāla and Devapāla, donated lands in the Gayā *vishaya* for the propagation of Buddhism (Nālandā copperplates of Dharmapāla and Devapāla). But an inscription, dated in the seventh regnal year of the fifth Pāla King, Nārāyaṇapāla, bespeaks of one Bhāṇḍadeva who had built a monastery for the Brahmanical ascetics in Gayā. The inscription introduces also a benediction to the man-lion incarnation of Vishnu (Narasimhāvatāra). This contemporary *prāśasti* of Nārāyaṇapāla suggests for the first time the early growth of Brahmanical religion in Gayā. Gayādhāma from this time onwards appears to have become also a seat of the Brahmanical Hindu faith with its numerous cults and ritual practices under the patronization of the local Brāhmaṇas. This bespeaks the religious tolerance of the Buddhist Pālas. No inscription of Gayādhāma of the early Pāla period (ninth-tenth century A.D.) has come to throw light on the religious history of the place. Thus, the aforesaid contemporary inscriptions of Nayapāladeva and Vigrahapāla III (eleventh century A.D.) are of great interest.

A STUDY OF SOME *GRAHA*-IMAGES OF INDIA AND
THEIR POSSIBLE BEARING ON THE *NAVA-DEVĀS*
OF CAMBODIA

By MRS. DEBALA MITRA

The series of nine divinities, usually depicted side by side on a panel, of Cambodia have of late been the subject of intensive study by Dr. K. Bhattacharya and Mr. L. Malleret.¹ As I found it difficult to agree with these learned scholars, regarding the identification of the figures occupying the third to the seventh positions, I thought of studying the images of *nava-grahas* in India. The only material readily available to me for examination since I went through the articles of Dr. Bhattacharya and Mr. Malleret is the panels in the collections of the Indian Museum, Asutosh Museum, Directorate of Archaeology of West Bengal and Bangiya Sahitya Parishad, all in Calcutta, and Khajuraho specimens, the latter, I must acknowledge, seen by me rather hurriedly. Previous to my perusal of the articles in question I had no doubt several opportunities of visiting Bhubaneswar where most of the temples have *grahas* on the architraves above the doorways. As it never occurred to me in those days to examine these *grahas* closely, my knowledge of the *graha*-representations of Bhubaneswar is rather casual. In the hope that scholars working in other parts of India may feel interested in publishing their own observations, which might shed better light on the concerned sculptures of Cambodia, Champa and Siam, I am presenting below first the results of my limited study on these *graha*-panels, reserving in the last part the examination of the *nava-devatās* of Cambodia in the light of the panels noticed here and also of the prescriptions of the texts cited in the table (pp. 31-37).

The Indian Museum has at least eight panels, bearing Nos. 9516, G.R. 13, 4167, 4185, 4169, 4168, 4183 and 4182. The first hails from Sarnath² (District Varanasi, Uttar Pradesh) and the second from Gaur³ (District Malda, West Bengal); the exact provenance of the rest,⁴ which came from Bihar, is not on the record of the museum. The first, as already noted by Dr. J. N. Banerjea, is a fragment of an *ashṭa-graha* piece preserving only the sinister half. No. 4185 is also a fragment with the first three of the group. No. 4169 is in three pieces. The *grahas* (except Rāhu who is represented by his bust or upper half in all the specimens examined here) are standing. The *vāhanas* occur only in Nos. 4183 and 4182, both of which depicting *nava-grahas* preceded by Gaṇeśa and followed by the ten incarnations of Vishnu.

The Asutosh Museum contains four specimens numbered T. 3683, AM. 119, T. 7271 and T. 1613, the first three from Bengal and the last from Bihar. Like the groups in the Indian Museum, the *grahas* are here standing,

¹ For references, see p. 27, footnotes 1, 2, 3 and 5.

² *An. Rep. Arch. Surv. Ind.*, 1935-36, p. 120, and Pl. XXXV, 2; J. N. Banerjea, *The Development of Hindu Iconography* (Calcutta, 1956), p. 444, and Pl. XXXI, 1.

³ J. Anderson, *Catalogue and Hand-book of the Archaeological Collections in the Indian Museum*, Part II (Calcutta, 1883), p. 261.

⁴ A short notice of Nos. 4167, 4168, 4169, 4182 and 4183 appears in the *Supplementary Catalogue of the Archaeological Collection of the Indian Museum* (Calcutta, 1911), pp. 80 and 83. No. 4168 appeared on Pl. LXIIIb of the *Eastern Indian School of Medieval Sculpture* (Delhi, 1933) by R. D. Banerji.

too, and except in the case of No. T. 3683, which is alone without *vāhanas*, all the three groups are preceded by Ganeśa.

In the collection of the Directorate of Archaeology, West Bengal, there are seven specimens, four of them fragmentary. The three complete specimens bear Nos. S. 213/214 (in two pieces with Nos. S. 213 and 214), S. 167 from Mallarpur (District Birbhum, West Bengal) and S. 34 from Bangar (District West Dinajpur, West Bengal). Among the four fragmentary pieces, all of which came from the District of West Dinajpur (West Bengal), No. S. 58 from Kushmandi seems to be the earliest; it preserves the two-armed Ganeśa, with his trunk applied to a bowl of *laddukas* held in his left hand, on a *viśva-padma*, the booted Ravi with the stalks of full-blossomed lotuses standing in *sama-pada* on a *viśva-padma* and Soma with a high *jaṭā-mukuṭa* and a rosary in right palm in *jñāna-mudrā* (left hand broken), all without *vāhana* and halo. No. S. 224 contains Ganeśa, with a bowl of *laddukas* (?) in his left hand and his right palm resting on a *parasu*, standing in *abhanga* on a *viśva-padma*, below which is his mount, Ravi in *sama-pada* with lotus-stalks in two hands and lower parts of the legs covered by the back-slab of his seated charioteer (lower part missing), Soma with a water-pot in left hand touching the thigh and Mangala, the last two in *tribhangā* and with their right palm on the chest (the attribute, if any, indistinct) and the lower portions of their legs missing. On No. S. 232 are Śani (major part missing) with a *danda* (?) having a roundish (slightly leaf-shaped at the crown) top with a central pellet in his left hand, Rāhu (bust), with palms in *argha-mudrā*, supporting a crescent above a wheeled cylinder and the three-hooded and snake-tailed Ketu in *kara-puṭa* above leaves or waves,¹ their halo being relieved with petals and pointed at the crown. The last fragment bears No. S. 225. The *grahas* are standing as usual in all the specimens except in No. S. 213/214.

The collection of the Bangiya Sahitya Parishad contains at least two specimens, one with seated *grahas* without any *vāhanas* and the other with standing ones along with Ganeśa and *vāhanas*.

The panels under study here thus fall into two broad categories, one without *vāhanas* and the other with them. Some of these panels without mounts, on stylistic grounds, are definitely earlier than those with mounts. It appears that the mounts are of later introduction, a presumption partially supported by the earlier strata of the *Purāṇas*. In chapter 51 of the *Agni-purāṇa* describing the *pratimās* of Sūrya and *grahas*, there is no reference to the *vāhanas*. The latter, which are simply chariots with horses (number differing in some cases) in all cases described in chapter 120, pertain more to astronomy than iconography proper.² But this chronological factor cannot be stressed too far till an all-India survey of the *grahas* has been accomplished. From the fact that many of the later *nava-grahas* of Orissa including those of Konarak are without *vāhanas*, it may be concluded that the mounts were not accepted (at least on the architraves) in all regions even after their introduction.

Among the panels without the mounts, No. 9516 (91 cm. long and 44 cm. high), of the Indian Museum from Sarnath, is definitely the earliest. With a projected band on its back side, it possibly formed part of an architrave. Being a fragment, it preserves Brihaspati, Śukra, Śani and Rāhu, Ketu being omitted altogether (Pl. I, fig. 1). Though Ketu did not appear on

¹ This *vāhana* faintly reminds one of the tourbillon of the Cambodian panels (cf. Prâh Khân, *Arts asiatiques*, IV, 3, p. 219).

² Marie-Thérèse de Mailmann, *Les Enseignements Iconographiques de l'Agni-purāṇa* (Paris, 1963), p. 234.

this piece and also on the earlier temples of Orissa, he was already recognized, as attested by the textual evidence, as a *graha* in the Gupta period¹ to which is ascribed the Sarnath piece. Brihaspati, Śukra and Sani carry a rosary in their right hand, the palm of Śukra facing the front and that of Sani facing the rear. The first two, in graceful *ābhanga*, hold in their left palm a water-pot which seems to have been the attribute in the left palm of Sani as well, as may be surmised from the nature of the breakage of his left forearm. The palms of Rāhu, with coiled beard, moustache, round protruding eyes, open mouth, ear-stud in his right ear and a *kundala* in the left and hair, tied by double cord, rising upwards in spiral curls, are in *tarpana-* or *argha-mudrā*. Thus the panel conforms largely to the description of the *Nirvāṇa-kalikā* (which, of course, mentions Ketu) as quoted by Mr. Bhagvandas Jain in his translation of Thakkura Pheru's *Vāstu-sāra-prakarana*. The standing posture of Śani, which differs from the preceding two and is similar to that of Budha as an archer in some sculptures under review, represents more the *ālīḍha* pose than his lameness. It is the only specimen of the groups in which Śani does not bear his peculiar *danda* (?) and is attributed like Brihaspati and Śukra as in most of the specimens from Orissa. Though one cannot be sure, it is likely that the missing Soma, Mangala and Budha also bore similar attributes as we find in a panel from Uttar Pradesh, now in the Worcester Art Museum, U.S.A.²

G.R. 13 (101 cm. long and 40 cm. high) of the Indian Museum from Gaur is a relief (Pl. II, fig. 2) out of an extremely coarse-grained stone which only partially accounts for its crude workmanship. Still it does not appear to have been a late specimen. Here also on a common plain pedestal are all the *grahas* except Ketu, the latter's upper half alone visible above the bust of Rāhu. The panel, with its rounded top corners, seems to have been an object of worship. The booted Ravi with the stalk of a full-blossomed lotus in both hands stands in *sama-pada* as in all the specimens under review. Soma, Mangala, Brihaspati and Śukra, all in *sama-pada*, appear to have a rosary (defaced in some cases) in raised right hand and a water-pot in left palm. Soma is distinguished by the crescent behind the head and Mangala by his inconspicuous pot-belly. Brihaspati's belly is normal as in the Sarnath specimen. Budha holds an arrow with both his hands, while a bow hangs on his left shoulder. His left leg is slightly bent anticipating his later *ālīḍha* pose befitting an archer. Among the texts quoted, the *Nishpanna-yogāvalī* alone prescribes for Budha both arrow and bow, the latter being also a prescription of the *Agni-purāṇa* which, however, enjoins *aksha* or *aksha-mālā* in the other hand. According to the *Vishṇudharmottara*, Budha should be like Vishnu, who as per chapter 60 bears a *gadā* and *chakra*, but, according to chapter 47, eight attributes including bow and arrow in 'Pradyumna's hands which symbolize Yogic fire with which the Yogins hit their supreme target'.³ Though it is tempting to find this idea

¹ Varāhamihira's *Brihat-saṁhitā*, Ch. 11. Though Amarasimha in his *kośa* recognizes Ketu as a *graha* (cf. third *kāṇḍa*, third *varga*, 60), in the second *varga* of the first *kāṇḍa* (verse 4) he omits Ketu and mentions the other eight *grahas* who are also referred to as lords of eight quarters. The *Vishṇudharmottara-purāṇa* in the chapter on *Sarvatobhadra-prasāda-lakṣhana* prescribes for the installation of the images of eight *grahas* (Ketu omitted) in four cardinal directions of the temple. Thus there was an early tradition of depicting the first eight *grahas* in the rôle of the guardians of quarters on the walls of the temples. Consequently when the *grahas* attained a position on the lintel or architrave of the sanctum-door, it was but natural for the *śilpī* to carve eight instead of nine *grahas*.

² *The Struggle for Empire*, ed. R. C. Majumdar, Bharatiya Vidya Bhavan's History and Culture of the Indian People, V (Bombay, 1957), Pl. L, fig. 107. As it is an *ashṭa-graha* piece, it is likely that the piece is earlier than the period assigned to it.

³ J. N. Banerjea, *op. cit.*, pp. 572 and 573.

expressed in the bow and arrow of Budha, whose *adhidevatā* and *pratyadidevatā* are Nārāyaṇa and Vishṇu respectively, the prescription in the *Aparājita-prichchhā* and the *Rūpa-maṇḍana* for Budha—*yogāsana* and *sarpāsana*—rather points to the form of the *yogāsana* Vishṇu on a serpent. In some of the figures studied here, Budha with his bow, arrow and extremely graceful *ālīḍha* pose and youthful appearance reminds one of Kāmadeva, while in some of the later ones with his mount dog and his inflated flung-about hair indicating swift movement in chase stresses for the hunting pursuits. Probably the idea underwent development at the hand of the artist-copyists. Śani, with his left leg slightly distorted indicating his lameness, touches his right thigh with his hanging right hand and holds a long *danda* (?) with a disc-like head, now damaged. I am mentioning it for convenience' sake as *danda* (?), as I am unable to name this peculiar attribute which is present in the left hand of Śani in all the specimens, except in the one from Sarnath. This attribute consists of a long staff-like handle with a top, often circular and sometimes leaf- or spoon-shaped conspicuously or inconspicuously, with or without a raised rim, with or without a central pellet and with or without the projected end of the *danda* above. Sometimes the interior is concave. The hands of the fierce-looking Rāhu are in *argha-mudrā*, while Ketu above Rāhu holds a sword (?) in the right hand, the left hand touching the head of Rāhu. It is not known if this arrangement of Ketu above Rāhu is conditioned by the lack of space or there is a hint for the mythological origin of Ketu from the chopped off body of Rāhu. While the iconography of Rāhu is nearly fixed almost from the beginning, considerable uncertainty hangs over Ketu who is sometimes a *nāga* and at times a *nāgī* with attributes varied. Ketu's connection with a serpent cannot be determined in this specimen, as there is no hood above the head and the lower half of the body is invisible.

Without entering into the relative chronology for which minute stylistic study is necessary in the absence of epigraphical data, it may be broadly stated that the next four sculptures noticed here do not seem to be later than the eighth century. No. 4185 (55 cm. long and 42 cm. high) of the Indian Museum is, as already noted, a fragment coming from Bihar. Here are preserved, standing in *sama-pada* on a common pedestal, three *grahas* remarkable for their robust modelling (Pl. III, fig. 3). The iconography of Ravi is fully standardized with his stalks of full-blown lotuses in hands, boots, *kirīṭa-mukuṭa* and *sama-pada* stance which are present in the remaining panels, too. He is distinguished from the other two not only by his folded flowing scarf and mode of wearing the long *dhotī*, but by his flanking attendants, Dāṇḍī and Pingala. The pot-bellied Soma, with *jaṭā-mukuṭa*, carries in his right hand a rosary and in the left a water-pot, these two attributes being enjoined for him in the *Agni-purāṇa*. With a rosary in right hand, Maṅgala, also with a *jaṭā-mukuṭa* but of plainer treatment, holds a long spear (*śakti*) in his left hand. The spear and rosary are prescribed for Maṅgala again in the *Agni-purāṇa*, while *śakti* is one of the four attributes enjoined in the *Matsya-purāṇa* and the texts with the *Matsya-purāṇa*'s prescriptions. The attribute is befitting Maṅgala who has Kārttikeya for *adhidevatā*, and in accordance with this genetic conception we find in some of the later panels a peacock as the *vāhana* of Maṅgala.¹

No. T. 3683 (89 cm. long and 32 cm. high) of the Asutosh Museum from

¹ It may be noted in this connection that in the early temples of Bhubaneswar (e.g. Paraśurāmeśvara temple, Svarṇajaleśvara temple and the northernmost temple of the Satruघneśvara group) Maṅgala is distinguished by the *sikhandaka* coiffure (Pl. XIV, fig. 16) and a *hāra* of amulets, a characteristic of the image of Kārttikeya.

Taldaha (District Nadia, West Bengal), now badly weathered, was originally of good workmanship (Pl. IV, fig. 4). With an oval halo incised on the back-slab by double lines, all of them have hair tied up in bun-shaped *jaṭā-mukuta*, with the exception of Ravi who bears his characteristic *kirīṭa-mukuta* besides his usual attributes and boots. Standing with a slight flexion are Soma, the pot-bellied Brihaspati and Śukra with a rosary (indistinct in the case of the first two) in the right hand and a hanging water-pot in the left. Maṅgala, with the damaged right hand resting near the shoulder like Soma, carries a spear in his left. Budha, also with flexion and with a bow held by the left arm-pit, holds the arrow in both hands. The lame Śani with a rosary (?) in his right hand carries the long *danda* (?) with a circular top having a raised rim. Rāhu with large ear-studs is in *argha-mudrā*. Ketu, in female form with a snake-tail¹ and three hoods, carries in her left hand a sword and in the palm of the right flames, the prescription of the *Agni-purāṇa* being sword and *dipa*. The attributes of Soma, Maṅgala, Brihaspati, Śukra and Ketu thus conform to the description of the *Agni-purāṇa* which also prescribes bow for Budha and *kinkini* (*sikhini* in one reading²) and *sūtra* for Śani. Now the usual meanings of *kinkini* are a small bell, tinkling ornament and a kind of drum. Is the peculiar attribute of Śani intended by the *Agni-purāṇa* when it enjoins *kinkini* (or some other word of which *kinkini* is a misreading)?

No. 4167 (74 cm. long and 27 cm. high) of the Indian Museum from Bihar is an excellent specimen (Pl. V, fig. 5). The *grahas*—Ravi, Brihaspati and Śukra in *sama-pada* stance, Soma and Maṅgala in *ābhanga*, Budha in *ālīḍha* and Śani limping—are as usual on a common plain pedestal. They are decorated tastefully with select ornaments and ornamental *dhotī*. With high *jaṭā-mukuta* are Soma, Maṅgala, Brihaspati, Śukra and Śani, the first four being pot-bellied. Besides the usual attributes, Ravi has a sword hanging by his left side. Soma, Brihaspati and Śukra hold a rosary in right palm in *vyākhyāna-mudrā* and a hanging water-pot in the left. Maṅgala, with his usual spear in his left hand, holds in his right palm a roundish object. The latter may be a *mātulunga* which is again an attribute of his *adhidevatā*, Kārttikeya. Distinguished by his short *mukuta* at the base of his rising hair tied up in an inflated bun, his youthful and comely appearance and *ālīḍha* pose natural for an archer, Budha, with an arrow held at ease in both hands and a bow resting against his left shoulder, reminds one strongly of Kāmadeva. With his *danda* (?) in left hand, Śani with a short *dhotī* holds rosary in his hanging right. Despite his coiled locks and beard, moustache and big face and eyes, the facial expression of Rāhu, in *argha-mudrā*, is rather benign. Ketu with a *karanya-mukuta* and the tail and hood of a snake is in *kara-puṭa*, as enjoined in the *Aparājita-prichchhā*, *Rūpa-mandana* and *Diparnava*.

The find-spot of No. S. 213/214 (98½ cm. long) of the Directorate of Archaeology of West Bengal is not known, but according to the dealer who sold it, it came from Bengal. Made of chlorite, it depicts the *grahas* (Rāhu as usual in bust) in seated position (Pl. VI, fig. 6) as in the case of the most of the *graha*-panels from Orissa. Ravi with his usual attributes and *kirīṭa-mukuta* is seated cross-legged with covered soles visible on a *viśva-padma*.

¹ Varāhamihira in chapter 5 (Rāhuchāra) of his *Brihat-samhitā* notes the view of some who conceived Rāhu in the form of a serpent with the body divided into head and tail (*mukha-puchchha-vibhaktāṅgam bṛujangamākāram*). Thus it appears that later on the iconographeres, on their acceptance of Ketu, gave him the form of Rāhu out of the lower portion of whom Ketu originated according to the mythology. Rāhu is called Ahi even in the later period.

² Marie-Thérèse de Mallmann, *op. cit.*, p. 82, n. 1.

Soma, Maṅgala, Budha, Brihaspati and Śukra are seated in *lalitāsana* on a decorated cushion and wear *jaṭā-mukuṭa*. The attributes in the hands of Soma, Brihaspati and Śukra, the last two pot-bellied with *udara-bandha* and without ear-ornaments, are a rosary in right hand and a hanging water-pot in left. With a globular object (*mātulunga*?) in his right hand, Maṅgala holds a spear in his left hand. Budha with two quivers visible above his shoulders carries an arrow, the bow being placed vertically by his left side. Śani is seated on a plain seat in an awkward poise indicating his lameness. With his peculiar *danda* (?) in his left hand, he appears to display *vyākhyāna-mudrā* with his right palm. Rāhu with his terrible facial expression is in his usual posture. The hooded Ketu with her snake-tail in three coils is in *kara-puṭa*. Thus this specimen is similar to the preceding one in respect of attributes, except in the one in the right hand of Śani.

Of the two specimens in the collections of the Bangiya Sahitya Parishad, the earlier one is without *vāhanas*. It (51 cm. long) served both as a lintel-cum-architrave of evidently a window or niche. In the centre of the lintel-portion, which is smaller in length than the upper portion, is a raised inset with the ablution of Sri-devi by two *diggajas* in the form of elephant-headed persons with pitchers held in their trunks.

In the upper portion, which formed the architrave, are the seated *grahas* with oval holes incised in double lines on the back-slab. Ravi with covered legs is seated cross-legged on a *viśva-padma*. Soma with a high *jaṭā-mukuṭa* is in *lalitāsana* on a pedestal of two mouldings. In his left hand, which rests on his leg, is a water-pot of the sprinkler type, the slightly raised right hand carrying a rosary. Maṅgala with a *jaṭā-mukuṭa*, a spear in his left hand and the right similar to that of Soma is seated in *mahārājālikā* on a cushion relieved with lotus-petals. Budha with a *kirīṭa-mukuṭa* and an arrow held by both hands is in *lalitāsana* on a decorated seat. Brihaspati and Śukra, both pot-bellied with an *udara-bandha* and with a high *jaṭā-mukuṭa* and attributes similar to those of Soma, are each on a footed seat. Resting on a cushion relieved with lotus-petals, the lame Śani with a high *jaṭā-mukuṭa* and a rosary in the right hand carries a *danda* (?) with a circular top (inside concave) having the projected end of the *danda* above. With a smiling face, Rāhu is in *argha-mudrā*. The snake-tailed single-hooded Ketu, with a conical *mukuṭa*, is in *kara-puṭa*. The figures with rounded plasticity are of good execution.

With No. 4168 (Pl. VII, fig. 7) of the Indian Museum from Bihar we enter into an art-trend which gives up the rounded modelling of rather heavy bodily forms with soft fleshiness in favour of slender body-type. The specimen (65 cm. long and 32 cm. high) thus is later than those noticed so far and may be of about the tenth century. The attributes in the hands are identical with those of the preceding one. Here all the *grahas* are standing inside miniature temples—alternately *rekha* and *khākharā*. The pedestal on which the miniatures rest is *pañcha-ratha* with two *khurā*-shaped mouldings having a recess in between. Ravi with a sword by his left side is in *sama-pada*, Soma, Maṅgala, Śukra and pot-bellied Brihaspati with high *jaṭā-mukuṭa* are with graceful flexion. Budha in *āśidha* is distinguished by the inflated hair with a central parting falling on two sides of the head. This kind of coiffure possibly indicates swift movement of the archer. The peculiar attribute in the left hand of the limping Śani, with high *jaṭā-mukuṭa*, has no projected end of the *danda* above the leaf-shaped portion. Tied by a snake the hair of Rāhu, who now wears rather a long beard, rises upwards as usual in spiral curls. Ketu with *karanya-mukuṭa* is a female with a snake-tail and hood.

The panels with the *vāhanas* under study are later than those without

mounts. One (No. S. 34 of the Directorate of Archaeology, West Bengal) may be dated to about the twelfth century on the basis of the palaeography of the short inscription on it. There is hardly any innovation in the iconographical features except that Rāhu is no longer empty-handed and holds usually the moon in the form of a crescent and exceptionally both the sun and the moon, and Ketu holds a shield and sword in some cases. Gaṇeśa, who was found only on one specimen (No. S. 58 of the Asutosh Museum from Kushmandi, District West Dinajpur) so far, invariably occupies the premier position in these panels. The combination of the *grahas* with Gaṇeśa, called Vighneśvara on account of his power of putting obstacles and removing them as well, is a natural alliance, and in the introduction of Gaṇeśa in the group of *nava-grahas* may be sought an added emphasis for averting evils and obtaining success. The *grahas* are presented as standing in all the specimens.

No. T. 1613 (51½ cm. long and 16½ cm. high) of the Asutosh Museum from Bihar does not appear to have been earlier than the eleventh century and may be even later. The figures, each with a halo pointed at the crown, are on a common platform on the front side of which are the *vāhanas*, the latter in most cases being in motion (Pl. VIII, fig. 8). Gaṇeśa, with his trunk on a *modaka-bhāṇḍa* held in his left hand and right hand resting on a *paraśu*, stands in *ābhanga*. His mount is the usual mouse, while that of Ravi is a galloping horso. Soma, in *tribhaṅga*, with the damaged right hand resting on the chest, holds a water-pot in the left. His *vāhana* is a fish. This aquatic mount is conceived probably due to his *pratyadhidevatā* being *jala*. Soma's connection with water is attested by some of the *Purāṇas*, according to which the cool-rayed moon (*śitāṁśu*) appeared out of the ocean during its churning by the gods and *dānavas*. The horses of Soma's chariot, according to the *Vishnu-purāṇa*, sprang from the bosom of water (*vāri-garbha-samud-bhavāḥ*).¹ Maṅgala is similar to Soma, but the rosary in his right hand resting on the chest is distinct. His mount is a *makara* not prescribed in any of the texts under reference. Budha, with an arrow in hands and a bow resting against his left shoulder, is in *ālīḍha*. His mount is an elephant, again not found in the consulted texts. His hair rises upwards in dishevelled curls, indicating his swift movement. Brihaspati, in *tribhaṅga* and with a rosary in right hand and water-pot in left, is not only pot-bellied but with a long beard, the latter being a feature in most of the later panels. The mount is a *hamsa* which is not only the mount of his *adhidevatā* Brahmā but which is prescribed for him by the *Aparājita-prichchhā*, *Rūpa-mandana*, *Dipārṇava* and the *pariśiṣṭa* of the *Vāstu-sāra-prakarana*. Sukra with a rosary in right hand held against the chest and a water-pot in the left is in *tribhaṅga*. His mount is a frog which is attributed to him by the *Aparājita-prichchhā* and the *Rūpa-mandana*. The limping Śani, in *chaturbhāṅga*, with a rosary (?) in right hand resting against the chest, carries his peculiar *danda* (?). His mount is a buffalo, mentioned in the *Aparājita-prichchhā*, *Rūpa-mandana*, *Dipārṇava* and *Śilpa-ratnākara*. This mount again is in conformity with that of his *adhidevatā* Yama. The palms of Rāhu are as usual in *argha-mudrā*, but with a crescent representing the moon in the clutches of Rāhu who, according to the story related in the *Mahābhārata* and some of the *Purāṇas*, causes eclipses by his efforts to seize the sun and the moon due to his implacable hatred for them, as they detected him when he, insinuating himself amongst the gods, was taking *amṛita* following the churning of the ocean and consequently was beheaded by Vishnu.²

¹ Book II, Chapter 12, *sloka* 3.

² The chopped head due to its having already tasted ambrosia became immortal and obtained a position as a *graha*.

His *vāhana* is an axle-tree with two wheels symbolizing probably the vehicle essential for a *graha* like Rāhu without legs. The hands of Ketu, a female with a snake-tail and the head of a snake above her head, are in *kara-puṭa*. Her mount looks like foliated leaves which may represent waves indicating the watery region.

No. AM. 119 (101½ cm. long and 49½ cm. high) of the Asutosh Museum from Kankandighi (District 24-Parganas, West Bengal) has been described in sufficient details by Mr. K. Datta.¹ It has been assigned to about the eleventh century A.D. by Mr. D. P. Ghosh, the curator of the museum. The slab, with its top edge beautifully carved, probably served as an object of worship. The *grahas*, with *tilakas*, along with Ganeśa are on a pedestal conceived in the form of a large double-petalled lotus (Pl. IX, fig. 9). From the stem are issued on two sides creeper-like scrolls enclosing various motifs, both vegetal and animal. Below these are the mounts—mouse, horse, *hamsa*, frog, wheeled cylinder and foliated leaves (or waves) in the case of Ganeśa, Ravi, Brihaspati, Śukra, Rāhu and Ketu as in the preceding specimen. Most of the mounts are here also in movement. All the deities have each a halo in the form of a partial lotus inconspicuously pointed at the crown. Ganeśa, with a flexion, carries a rosary in his right hand, his left hand resting over the top of a *paraśu*. Soma, Maṅgala and Śukra, each with a *kirīṭa-mukuṭa*, stand with three flexions. The mount of Soma, with a rosary in the right palm in *jñāna-mudrā* and a water-pot in the left hand, is a heavy-bodied animal with curved horns (one visible) and a short tail like a ram. If the rows of incisions on its body stand for fleece, it may represent ram as identified by Mr. Datta. Maṅgala, with a spear in his left hand, holds in his right palm, in *jñāna-mudrā*, a ring which may represent a rosary. His mount is a peacock which is not prescribed by any of the texts noted here. But both the mount and the attribute spear are in accordance with his *adhidevatā* Kārttikeya. Budha, in *ālīḍha*, with an arrow in both hands and a long bow resting against his left upper arm, is distinguished by his neatly-done inflated coiffure. His mount appears to be a running hunting dog, not recognized in the texts under study. Evidently Budha is in a hunting rôle. The pot-bellied, bearded and moustached Brihaspati, in *ābhāṅga* and with a high stylized *jaṭā-mukuṭa*, and Śukra hold a rosary in the right palm facing front and a hanging water-pot in the left. The lame Śani, with *kirīṭa-mukuṭa*, four flexions and a rosary in right palm facing front, carries his *danda* (?) which has a projection above the roundish top, the latter having a raised rim with incisions. His mount is an ass not found in the texts concerned, but finds mention along with many others including *bhujaga*, *mahisha* and *karabha* as belonging to Śani in the *Vārāhi* (*Brihat*) *Śamhitā*.² The upper half of Rāhu, with a crescent in the palms in *argha-mudrā*, is depicted as attached to a wheeled axle-tree. Ketu, with a snake-tail and five hoods, a sword (*khaḍga*) in his right hand and a shield (*charma*) in his left, conforms to the description of the *nāgas* in the *Mānasollāsa*.³

No. S. 34 (35 cm. long) of the Directorate of Archaeology of West Bengal from Bangar (District West Dinajpur, West Bengal) depicts the deities each on a *viśva-padma*, below which is the respective mount (Pl. X, fig. 10). The haloes are pointed like those in No. T. 1613. There is a short inscription in the characters of the twelfth century at the dexter end above a kneeling

¹ 'Two Saura Images from the District of 24-Parganas'. *Ind. Hist. Quart.*, IX, 1933, pp. 202-207.

² Venkatesvara Press ed. (Bombay, Samvat 2009), Ch. 16, p. 85.

³ Part II, ed. G. K. Shrigondevkar, Gaekwad's Oriental Series, LXXXIV (Baroda, 1939), p. 70.

devotee who probably represents the donor. All are bejewelled except Brihaspati and Sani and possibly Ketu. The mounts are identical with those of the preceding panel with the exception of that of Soma, the mount of Ketu being either defaced or unfinished. In *ābhanga* is Ganeśa with his trunk applied to the broken object in his left palm, his right hand resting on the *parasu*. Ravi is in the usual posture and attributes. Soma, with a rosary (?) in his right palm resting on the chest and a water-pot in left hand, stands in *tribhanga* which is also the stance of Maṅgala, Budha and Śukra. His mount is a *makara* (resembling an elephant), an aquatic creature denoting his connection with water. Maṅgala, with the right palm resting on the chest (object if any indistinct), holds a spear in his left hand. Budha, with the damaged arrow and a bow (?) against the left shoulder, is characterized by his hair spread above his head like a halo. His dog with the open mouth is evidently in the attitude of barking. The bearded and pot-bellied Brihaspati, with a slight flexion and with a rosary (?) in his right palm on the chest, carries a water-pot (damaged) in the left. Śukra also bears the same attributes. Sani, with right palm on the chest and his usual *danda* (?), is limping, pot-bellied and fierce-looking. Rāhu holds a large crescent in the palms placed on the seat. Ketu, with a single hood and snake-tail, is in *kara-puta*.¹

The specimen (39 cm. long), with mounts, of the Bangiya Sahitya Parishad is similar to the preceding one in so far as the attributes and mounts are concerned. Here also Ganeśa occurs with his mouse. With legs posed roughly like an archer, Budha holds an arrow in both hands, a bow being on the sinister. With his coiffure spread like a halo he is youngish in appearance. The dog with its raised tail is both running and barking. Ketu, a female with a single hood and tail, is above waves (?). Of rather crude workmanship and summary treatment, this late specimen seems to have been an object of worship.

No. T. 7271 (33 cm. long and 16½ cm. high) of the Asutosh Museum from North Bengal presents Ganeśa and the *grahas* standing on a common *viśvapadma* pedestal from the sinister end (Pl. XI, fig. 11). Of crude workmanship, the panel, possibly an object of worship, does not appear to have been earlier than the eleventh century and maybe even later despite the elongated halo rounded at the top and incised on the back slab in double lines and beardless Brihaspati. The attributes of Ganeśa and Ravi are similar to those of the preceding one. Soma, Maṅgala, slightly pot-bellied Brihaspati and Śukra, in *ābhanga*, with a water-pot in the left hand, display *vyākhyāna-mudrā* (rosary is not visible). With the same *mudrā* in the right hand, the limping Sani holds his *danda* (?) with a leaf-shaped tip. Budha, in *ālīḍha*, with an arrow in both hands, is distinguished by his loose hair spread like a fan around the head. Rāhu bears a crescent above palms resting on the seat in *argha-mudrā*, while Ketu with a serpent-hood and tail carries a sword in his right hand and a shield in the left. The mounts—mouse, indistinct animal, heavy-bodied creature with rather pointed mouth, *hamsa*, dog (?), slightly long-tailed bird, animal (ass? or horse?), heavy-bodied animal with a large roundish head, wheeled axle-tree and indistinct

¹ The specimen of the State Museum of Lucknow illustrated as Pl. XXII of the *Indian Images*, Part I (Calcutta and Simla, 1921), by Brindavan C. Bhattacharya seems to conform to this specimen in respect of attributes and *vāhanas*. Budha is here in *ālīḍha* and Brihaspati is not pot-bellied. Ganeśa is not represented. The mount of Maṅgala is rather indistinct in the photograph and may be a peacock with a snake in its beak. It is difficult to recognize a dog in Budha's mount. One is not certain of the identification of the mounts of Maṅgala and Budha from the photograph.

object—are badly defaced. Still one wonders if there are some exchanges of mounts due to copyist's mistake.

No. S. 167 (45½ cm. long) of the Directorate of Archaeology of West Bengal from Mallarpur (District Birbhum, West Bengal) is almost defaced (Pl. XII, fig. 12). The *grahas*, without haloes, are standing above *viśva-padmas*, Rāhu being represented by his entire upper half including the upper part of the hip. Ganeśa with right hand resting on a *parasū* and trunk on an indistinct object in the left palm is in *ābhanga*. Ravi with his usual attributes is in *sama-pada*. Soma with his right palm on the chest and a water-pot (?) in left is in *ābhanga*. Maṅgala with right palm on the chest and a spear in left hand is also in *ābhanga*. Budha with his attribute indistinct is in *ālidha*. The bearded pot-bellied Brihaspati with a water-pot in the left hand and Śukra with right palm on the chest and a water-pot in the left are in *ābhanga*. Sani with right palm on the chest and his peculiar *danda* (?) with a roundish top is limping. The terrible-looking Rāhu is with a crescent in palms. Ketu with the tail of a snake holds a sword (?) in left hand. The mounts of Ravi, Soma and Maṅgala seem to be horse, *makara* and peacock. Other *vāhanas* are defaced beyond recognition.

No. S. 225 (Pl. XII, fig. 13) of the Directorate of Archaeology of West Bengal from West Dinajpur preserves the head of the bearded Brihaspati, the upper half of the standing Śukra with right palm on the chest, the limping Sani with a rosary in the right palm in *jñāna-mudrā* and his *danda* (?) with a spoon-shaped top having a central pellet in the left, Rāhu with his palms supporting a large crescent (his body being attached to the wheeled axle-tree) above a *viśva-padma* and the snake-tailed Ketu with right palm possibly in *jñāna-mudrā* and a sword in the left hand, also above a *viśva-padma*. Of crude workmanship, none of the *grahas* has any halo.

Nos. 4183 and 4182 of the Indian Museum, both from Bihar, are crudely executed lintels assigned to about the twelfth century A.D. and combine standing *nava-grahas* with the ten incarnations of Vishṇu. Preceding the *nava-grahas* is the four-armed seated Ganeśa. In No. 4183, each figure is within an arch resting on pilasters (Pl. XIII, fig. 14). Starting from the extreme dexter is Ganeśa in *mahārājālīlā* with a bowl of eatables, *parasū*, radish and *vara* respectively in his lower left, upper left, upper right and lower right hands. His mount is a mouse. Ravi is with his usual attributes and horse. The slightly pot-bellied Soma, in *ābhanga*, is with a rosary (?) in the right palm in *jñāna-mudrā* and a water-pot in left, his mount being indistinct. Maṅgala, in *ābhanga*, with right hand similar to that of Soma, holds a spear in the left, the animal being indistinct. Budha, also in *ābhanga*, is with an arrow in hands and a bow in the left arm-pit, his animal mount also being indistinct. Brihaspati and Śukra are similar to Soma in all respects. While the mount of Brihaspati seems to be a *hamsa*, that of Śukra is indistinct. The limping pot-bellied Sani holds his *danda* (?) with a leaf-shaped top in his left hand, the right being similar to that of Soma. His mount is also not clear. The mount of Rāhu, with a crescent in palms in *argha-mudrā*, is the wheeled axle-tree. Ketu with a hood and the tail of a snake is in *kara-puta*, the mount being indistinct.

In No. 4182 (Pl. XIII, fig. 15), which may be earlier than No. 4183, the group starts from the sinister. Among the attributes of Ganeśa with lower left hand broken, a *parasū* and a radish in the upper left and right hands can be recognized. Ravi is in his characteristic attributes. The mount of the pot-bellied Soma, in *ābhanga*, with a rosary in raised right hand showing palm and a water-pot in the left, is a *makara*. Maṅgala, in *ābhanga*, holds a spear in his left hand, the right hand being similar to that of Soma. His mount is a squatting heavy-bodied animal. Budha, in *ālidha*,

holds an arrow in two hands and a bow against the left arm-pit. His hair, with a central parting, spread on two sides. His mount is also indistinct. Brihaspati is similar to Soma. The pot-bellied Šukra, in *ābhanga*, is with a rosary (?) in right hand and a water-pot (broken) in the left. The limping Šani holds a rosary in his right hand and his *danda* (?) with a disc-like top in his left. Rāhu, in *argha-mudrā*, holds the crescent in right palm and disc (the sun) in his left. The snake-tailed and hooded Ketu is in *kara-puṭa*. The mounts of Brihaspati and the following *grahas* are all broken.

Nava-grahas are very prolific in the temple-town of Khajuraho (District Chhatarpur, Madhya Pradesh). Among the standing temples, Lakshmana with three of its corner shrines,¹ Viśvanātha, Javari, Chaturbhuj, Dulādeo, Ghantāi and Pārvanātha, along with some of the minor shrines and chapels like those of Sumatinātha, Mahāvīra, Śitalanātha and Śāntinātha, bear *nava-grahas* on the lintels. In the local Jardine Museum there are not less than 25 lintels and panels with these *grahas* besides several cult-images with them. One of the loose lintels lying within the compound of the Pārvanātha temple is again relieved with *grahas*.

The standing *grahas* (Pl. XV, fig. 17) are as common as the seated ones (Pl. XV, fig. 18). The attributes in the hands are standardized so that, with the exception of the group on the lintel of the Lakshmana temple, the *grahas*, whether seated or standing, present almost uniform features in all the specimens.

Ravi with *kirīṭa-mukuta* (sometimes with a *kavacha*), boots, stalks of two lotuses, usually fully blossomed, is distinguished by his *sama-pada* stance, when standing, and by his peculiar sitting posture with folded legs (rarely cross-legged) with soles resting on ground, when seated. Soma, Mangala, Budha, Brihaspati, Šukra and Šani display with their right hand *abhaya-mudrā* (exceptionally thumb and forefinger touching as in *vyākhyāna-mudrā*) and hold in their left hand a water-pot. Šani, when standing, is shown usually as lame with one of the legs stretched and the other bent and sometimes retraced backward. Brihaspati, Šukra and Šani are very rarely pot-bellied and bearded. Rāhu (usually bust and exceptionally head and neck or the major portion of the upper body), rarely fierce-looking (usually peaceful and even smiling in a few), with or without beard, is with palms (in one case Rāhu is without hands at all) in *argha-mudrā*. Ketu (male in some cases and female in others), usually with the hood (often multi-hooded and in rare instances without any hood) and tail of a snake, is generally in *kara-puṭa* and rarely displays *abhaya-mudrā* in the right hand and carries a water-pot in left hand or holds a water-pot with both hands.

It appears that the mounts did not find favour with the artists and their clientele, but that these were not entirely unknown here is proved by a panel (No. 436 of the museum) and the lintel of the Lakshmana temple. In the panel (Pl. XVI, fig. 19) the first seven have mounts by their sides. These *vāhanas*, of which the heads are alone carved in most cases, are very badly defaced. Ravi's mount is a horse. Soma's mount seems to be an animal with a large head (lion?). The head of the mount of Budha may be speculated as that of an elephant, and a frog seems to be the mount of Šukra.

The *nava-grahas* occur on the upper register of the lintel of the sanctum of the Lakshmana temple, Ravi (dexter), Brihaspati (centre) and Ketu (sinister) being within projected insets (Pl. XVII, fig. 20). Ravi with

¹ The fourth bears dancing *Sapta-māṛikās* with Virabhadra and Ganeśa. *Māṛikās* occur also with *nava-grahas* in several lintels.

kavacha, *kirīṭa-mukuta* and stalks of fully-blossomed lotuses in hands is seated on a chariot with horses (five visible). In front of the feet is a seated female with *abhaya* in her right hand and a water-pot in left palm. Soma with his right hand in *abhaya-mudrā* and the left holding a hanging water-pot is standing in *tribhanga*. Maṅgala with *abhaya* in his lower right, lotus-stalk (?) in upper right, a manuscript in upper left and a hanging water-pot in lower left is also in *tribhanga*. His mount seems to be a peacock. Budha is similar to Soma in attributes and standing pose. His mount is an elephant. Brihaspati with *jaṭā-mukuta*, a sacrificial ladle in his upper right, a manuscript in the corresponding left and a hanging water-pot in the lower left (lower right broken) is in *lalitāsana*. His mount is a *hamsa* (damaged). Śukra is similar to Soma. Śani with his right leg stretched and left bent and retraced behind the right holds a lotus-stalk in his upper right, a manuscript in upper left and a hanging water-pot in lower left, the lower right displaying *abhaya-mudrā*. His mount is indistinct (*gridhra*?). The beardless Rāhu (bust) with coiled locks rising upwards and peaceful facial expression is in *argha-mudrā*. Ketu, a male with five hoods and a snake-tail, carries a ring-like object in his upper right hand, a manuscript in the upper left and a water-pot in the palm of the lower left, the lower right hand being broken.

The seven sculptures in the projecting niches inserted in the *pābhāga*-mouldings of the exterior walls of the sanctum, *mahā-mandapa* and *mandapa* of the Lakshmaṇa temple seem to represent the first seven of the *grahas*. There is no doubt about the booted Ravi who, without mount and with lotuses (broken), is standing in *sama-pada* in the west niche of the wall of the sanctum. The lower left hand of the remaining six, which most probably carried a hanging water-pot, is broken. The deity in the south niche of the sanctum is standing on a lotus-stand with two conspicuous flexions (head inconspicuously tilted) and carries in his upper right and left hands respectively a lotus-stalk ending in a scroll and a manuscript, the lower right hand being in *varada-mudrā* with a rosary encircling the palm. Though he has no mount, which is also absent in his case on the lintel of the sanctum, he may be identified with Soma on the basis of the crescent on his *jaṭā-mukuta*. The corresponding niche on the north side shows possibly Maṅgala, in *tribhanga*, on a lotus-leaf. His lower right hand is in *vyākhyāna-mudrā*, with a rosary, the upper right holds a lotus-stalk ending in a scroll and the upper left a manuscript. The objects in his upper hands correspond with those in the hands of Maṅgala on the lintel. The mount, however, is an animal with a short tail, probably a goat prescribed for him in some texts. In the north niche of the *mahā-mandapa* is Budha, in *dvi-bhanga*, with a manuscript in the upper left hand and with an elephant, an animal also found with Budha on the lintel. The corresponding south niche bears Brihaspati, in *tribhanga*, on a lotus-leaf, with a *hamsa*. His lower right hand is in *varada-mudrā* with a rosary encircling the palm and upper left holds a manuscript. In the north niche of the *mandapa* is Śukra, in *dvi-bhanga*, with *vara* in his lower right (with a rosary encircling the palm), the stalk of a full-blown lotus in upper right and a manuscript in the upper left hand and a frog as mount. The corresponding south niche possibly bears Śani standing with his right leg slightly stretched and left slightly bent and retraced, the left foot resting on a thin foot-rest relieved with lotus-motif. This standing pose was found in the case of the lame Śani on some of the lintels and panels of the Jardine Museum. Three of the fore-arms are missing and the fourth (lower right), in *varada-mudrā* with a rosary, is alone preserved.

In the university area of Sagar there lies in the open ground a *nava-graha*

slab (Pl. XVIII, fig. 21) which originally hailed from Rehli¹ (District Sagar). Here mounts accompany the first seven *grahas*. The mounts of Ravi, with the usual attributes and *sama-pada* stance, are a pair of horses resting on the ground. Soma, Maṅgala, Budha, Brihaspati and Śukra, with high *jata-mukuta*, are standing in *tribhanga*. With their right palm (palm of Maṅgala and Śukra damaged), displaying *vyākhyāna-mudrā* with the thumb and forefinger touching (but the palm is near the shoulder instead of the chest), they hold in their left hand a hanging water-pot. The head of the animal, which lies by the left of Soma, is damaged. Though it bears similarity with the horses of Ravi, its waist is comparatively thin like that of a lion, but there is no mane. The mount of Maṅgala is a *makara*, an animal found associated with Maṅgala on No. T. 1613 (from Bihar) of the Asutosh Museum. The mount of Budha is a snake-tailed male with three hoods in *kara-puṭa*. Evidently it stands for *sarpa*, prescribed for the *āsana* of Budha in the *Aparājita-prichchhā* and *Rūpa-mandana*. The mount of Brihaspati, which has some appearance of a *hamsa* as depicted on some images in Khajuraho, has to be identified with a peacock on account of the crest. The mount of Śukra is a frog, not only prescribed for him in the *Aparājita-prichchhā* and the *Rūpa-mandana* but occurring in several slabs of eastern India. The dress, coiffure and the attributes of Śani are similar to those of the preceding five, but he stands with his right leg stretched and left bent. His mount is an animal with longish head and erect ears. As its upper body is depicted and that, too, showing facing its lord, it is difficult to identify it and even to see in it an ass. The bearded, moustached Rāhu (major portion of the upper body) is in *tarpana-mudrā*. Ketu (above Rāhu) is a female with a snake-tail and hoods and damaged hands in *kara-puṭa*.

Among the specimens surveyed, the Sarnath piece is definitely the earliest and may be taken tentatively as the arch-type. On it the first four *grahas* are missing. On the analogy of the specimen from Worcester Art Museum, which also hailed from Uttar Pradesh and which, though later than the Sarnath one, is a rather early specimen (p. 15 and footnote 2), it is very likely that the missing Ravi held lotuses, and Soma, Maṅgala and Budha, like Brihaspati, Śukra and Śani, carried a rosary in their right hand, probably in *abhaya-mudrā*, and a water-pot in the left.²

If one is permitted to generalize on the evidence of the limited specimens examined here, it may be said that Central India, or a part thereof as represented by Khajuraho, followed the arch-type almost orthodoxy so far as the attributes of Ravi, the pose of the right hand and the attribute in the left hand of the six *grahas* following Ravi and the hand-poses of Rāhu are concerned. Brihaspati, even in later specimens, is usually without beard and pot-belly as in the Sarnath specimen. The only innovation is the introduction of Ketu, who is usually in *kara-puṭa* and exceptionally with right hand in *abhaya-mudrā* and a water-pot in left or a water-pot in both hands. The nearest approach of this group is to the *Nirvāna-kalikā* which, however, prescribes in the right hands of Soma to Śani and Ketu rosary, found in the Sarnath and Worcester Museum specimens and also in

¹ *Indian Archaeology, 1959-60—A Review* (New Delhi, 1960), ed. A. Ghosh, p. 70, and Pl. LX A. The published photograph does not show the lower portion of the slab which contains the mounts.

² The colossal Varāha, dated in the first year of the reign of the Hūna king, Toramāṇa, from Eran, bears on its body the representations of the first seven *grahas*. Here, Ravi with a long coat and *kirīṭa-mukuta* holds lotus-stalks in both hands and the remaining *grahas* carry a long-necked water-pot with a conical bottom in their left hand, their raised right hand being most probably in *abhaya-mudrā*.

the case of the individual images on the walls of the Lakshmana temple. Despite its reticence, Central India could not be entirely immune to the introduction of the mounts.

Another region which conservatively followed the attributes of the Sarnath specimen seems to have been Orissa. In Bhubaneswar, many temples with dates varying from the seventh to the thirteenth century A.D. have Ravi with stalks of lotuses and Soma to Śani with a rosary in their right hand (in *abhaya-* or *varada-mudrā*) and a water-pot in left. In the early temples Rāhu is in *tarpana-mudrā*, but in later temples he holds either the moon or both the sun and the moon. The attributes of Ketu, altogether absent in the early temples, are varied: sometimes he is in *añjali-mudrā*, in some temples both the arms are simply raised and in some he carries in his right hand a sword and in left a shield. On the architrave of the Konarak temple Ketu holds a bowl of flames in his left hand and a sword or staff in right. The *grahas* in this region are generally shown seated and without *vāhanas*.

From the specimens studied here, it appears that Bengal and Bihar shared common ideas not only in art-trends but also in the development of the iconography at least of the *grahas*. Both these areas followed the same stability and fluctuations in the iconographical features, except in the case of Ketu who is in *kara-puṭa* in all the examples from Bihar. As none of these specimens from these two States is earlier than the sixth century, it is not known if the earlier ones were analogous to the Sarnath specimen or they followed a different tradition from the beginning. But from the fact that at Paharpur Brihaspati holds a manuscript and a rosary, it may be presumed that Bengal was prone to departures from the arch-type as represented by the Sarnath specimen even from the early period.

Taking the Sarnath specimen as the early model and confining ourselves to the foregoing specimens of Bengal and Bihar, we find that the iconography of Ravi, Soma, Brihaspati and Śukra, who underwent hardly any changes from the arch-type, was already crystallized by the eighth century A.D., so far as their attributes are concerned.¹ By this date as well Śani acquired in his left hand his peculiar *danda* (?) and Budha his arrow to which they clung faithfully till the thirteenth century at least, but the right hand of Śani, usually with a rosary, often displayed some *mudrās*. Mangala also received by this date a *sakti* in his left hand and nearly by this time a *mātulunga* (?) in his right palm. But he prefers a rosary in his right hand in the later period. Sometimes he reverts to his original attributes, i.e. rosary and water-pot. Rāhu hardly gives up his original *mudrā* but holds the symbol of the moon and rarely symbols of both the sun and the moon in his palms. Ketu's attributes are rather flexible till the thirteenth century.

It appears that the sculptors of Bengal and Bihar were guided, in respect of the attributes, by some texts like the *Agni-purāṇa*, which, of all the texts noted here, accords considerably well with the panel of these two areas. But then there is no agreement with regard to the mounts which, due to their wide flexibility and variation, are evidently of different inspirations.

Further, it is not always possible to trace the origin and development of the iconographical features and the mounts of the *grahas* from the gods who are supposed to preside over them. According to the texts like the

¹ In some panels the right hand of Soma, Brihaspati and Śukra shows only some *mudrā* without any visible attribute and one is not sure due to the defacement if actually they held a rosary or not.

Matsya-purāna, the *adhidevatā* and the *pratyadhidévatā* of the *grahas* are as follows: Siva (*adhidevatā*) and Vahni (*pratyadhidévatā*) for Ravi, Umā and *jala* for Soma, Kārttikeya and Prithivī for Mangala, Nārāyaṇa and Vishṇu for Budha, Brahmā and Indra for Brihaspati, Indra and Śachi for Śukra, Yama and Prajāpati for Śani, Kāla and *sarpa* for Rāhu and Chitragupta and Brahmā for Ketu. But we have seen that several of these *graha*-figures do not permit themselves to affiliate with the *adhidevatās* or the *pratyadhidévatās* in respect of attributes and mounts.

Now to consider the so-called *nava-devās* of Cambodia. Dr. K. Bhattacharya, in his three notes entitled 'Les "Neuf Deva"',¹ 'Le Soleil et la Lune'² and 'Une série de "Neuf Dieux"'³ on the Khmer iconography, has examined 14 specimens including fragments. Of the nine deities depicted side by side in the reliefs, the first two and the last two have been identified respectively with Sūrya (on a chariot of horses), Chandra (usually on a pedestal and rarely on a chariot of horses), Rāhu (amidst or above tourbillion of clouds) and Ketu (on a lion), the first, the second, the eighth and the ninth of the traditional *nava-grahas* of India. The remaining five have been variously identified with Indra, Agni, Yama, Vāyu, Kubera, Isāna, Brahmā, Vishṇu and Skanda on the basis of their *vāhanas*, as the mounts vary except in the case of the fifth (identified with Indra) and the sixth (identified with Kubera) figures in the series where the animals are elephant⁴ and horse respectively. On the basis of these identifications, he refutes the older theory that recognized in the nine deities *nava-grahas* and suggests the combination of four *grahas* with *dikpālas*—an Indo-Khmer innovation.

Similar views are expressed by Mr. L. Malleret in his chronological treatment⁵ of the groups of nine divinities of Cambodia and Champa where he has rendered a very useful and elaborate account of 41 reliefs (including those studied by Dr. Bhattacharya), apart from the separate representations of individual deities. The identifications of the deities in the series suggested by Dr. Bhattacharya are upheld by Mr. Malleret except in rare cases where he, due to his personal examination of the sculptures themselves, differs from Dr. Bhattacharya in respect of the animals and consequently of the deities. Thus according to him also, the first, second, fifth, sixth, eighth and ninth are respectively Surya, Chandra, Indra, Kubera, Rāhu and Ketu, the permutations being in the case of the third (identified doubtfully or undoubtedly with Yama on a bull in 11 specimens, Agni on a ram in two cases, Agni (?) on a beaked bird in one case, Vāyu on a *mṛiga* in one specimen, Brahmā on a goose in one case, Skanda (?) on a rhinoceros in one case and Brahmā or Skanda depending on the animal being a goose or a peacock in one case), the fourth (identified with Brahmā on a goose in 18 cases, Brahmā or Skanda depending on the animal being a goose or a peacock in three cases, Vāyu on a *mṛiga* in one case, Agni (?) on a parrot in one case and Vishṇu (?) on a *garuda* (?) in one case) and the seventh (identified with Agni on a ram in 14 cases, and Yama on a bull at least in two cases). Mr. Malleret also claims for the theme, an originality conceived by the Khmers and Chams independent of the Indian tradition.

¹ *Arts asiatiques*, III, 3, 1956, pp. 183–93.

² *Ibid.*, IV, 3, 1957, pp. 216–20.

³ *Ibid.*, V, 3, 1958, p. 220.

⁴ The animal of the fifth in the specimen from Preah Vihear is said to be a lion, which is again taken as a mount of Indra, *Arts asiatiques*, IV, 3, p. 218, n. 5.

⁵ 'Contribution à l'étude du thème des Neuf Divinités dans la sculpture du Cambodge et du Champa'. *Arts asiatiques*, VII, 3, 1960, pp. 205–30.

Though I have not the opportunity of seeing these panels with the exception of the one in the Musée Guimet, I cannot help noting the following points on the near-certainty of these friezes depicting *nava-grahas*, as supposed by some earlier scholars.¹

The new theory involves the medley of four of the *grahas* with five *dikpālas* on a single independent panel. This seems rather unnatural, particularly when these panels are regular features for several centuries from the seventh century onwards. The almost identical dress, coiffure and ornaments of the figures (Rāhu's dress being invisible due to the tourbillion in most cases) and the attitude of sitting of the third, fourth, fifth, sixth, seventh, Ketu and Rāhu (when he is depicted above the tourbillion) point to a grouping of cognate deities and when the first two and the last two strictly follow the order of the traditional *grahas*, it is but natural to expect in the intermediate figures as well the remaining *grahas*, too, instead of introducing deities of alien group.

At least two uses of some of these friezes are known definitely. Thus, as noted by both Dr. Bhattacharya² and Mr. Malleret,³ the inscription (A.D. 1001) on the specimen from Ak Yōm informs us that the panel was offered as a votive object to Siva called Gambhiresvara.⁴ No doubt the inscription here does not name the figures as *grahas*, but the inscription of Prah Phnom⁵ cites at least one instance where a *linga* was established along with images of *grahas*. The stele (eighth century) from Tañ Krañ⁶ recording grants of rice-fields and preambles with the names of the nine *grahas* further proves that the *grahas* were familiar in Cambodia. The second use of some of these friezes was as an architrave over the lintel of the door, as indicated⁷ by the specimen from the east door of Nāk Tà Koñ Sròk. This usage, which is in conformity with the Indian practices, particularly in Orissa and Central India where the temples have the architrave over the door-frame of the sanctum and the main entrance of the porch usually carved with *nava-grahas*,⁸ is again a pointer towards the reliefs as being those of the *nava-grahas*. Among the *nava-graha* panels from Bihar and Bengal now in different collections of Calcutta, some bear indubitable signs of their original position as architraves, while others, usually of smaller dimensions, give the impression of their original use as an independent object of worship. It is not known to me if the latter were fixed in the interior face of the front wall as in some cases of Cambodia or were established on a pedestal.

The identification of the five intermediate figures has mainly been based on the *vāhanas*, as the attributes in the hands of the deities are in most cases either broken or indistinct. Even when the attribute is clear and identified, its evidence has been brushed aside if it is not in accordance with the prescribed attribute of the deity identified on the basis of the *vāhana*. Thus the seventh figure has been taken as Agni whenever he rides a ram even if he holds a *dandā*, an attribute least expected in the hand of Agni. Further the images identified with Skanda, Brahmā and Vishnu lack even the essential traits of their iconography. The identity of

¹ H. Parmentier, *L'Art Khmèr Classique* (Paris, 1939), p. 77.

² *Arts asiatiques*, II, pp. 188 and 198.

³ *Ibid.*, VII, 3, p. 207.

⁴ G. Coedès, *Inscriptions du Cambodge*, V (Paris, 1953), p. 59.

⁵ *Ibid.*, III (Paris, 1951), p. 120.

⁶ *Ibid.*, V, pp. 76-77.

⁷ L. Malleret, *op. cit.*, p. 212.

⁸ This depiction is also enjoined in the Orissan *Silpaśāstras*, cf. N. K. Bose, *Canons of Orissan Architecture* (Calcutta, 1932), pp. 174 and 176.

the *vāhanas* is again not beyond doubt in some cases due to the representation of the animals *en face*, their damaged state or unnatural depiction.

Among the friezes represented by Mr. Malleret, the earliest (i.e. of Sambór-Prei 'Kük) can definitely be identified as a *nava-graha* slab not only from the first (Ravi), the second (Soma) and the eighth (Rāhu) but also from the seventh figure, doubtfully identified by Mr. Malleret with Kubera on account of the 'massue'. The last holds a long staff in its right hand and stands in a posture which distinguishes it from others. This posture is befitting of Śani who, according to the *Amśumadbhedāgama*,¹ is *iṣṭat-pāṇi* and holds a *danda* in his right hand. Panels of *nava-grahas* with the limping figure of Śani are quite common in Bengal and Bihar. Though the attributes in the hands of the third, fourth, fifth and sixth are not recognizable, the position of their arms, which are identical, is not unlike those of some of the panels of eastern India. One of the two prescriptions occurring in the *Silpa-ratna*² enjoins that the *grahas* beginning with Chandra and ending with Ketu (Rāhu being described as *karāhitāñ-jaliyuk* is evidently an exception) have their left hands on the left thigh, the right hands being in *abhaya-mudrā*. The same prescription for the *grahas* with the exception of Ravi occurs in chapter 299 of the *Agni-purāṇa*.³ As can be seen from the photographs published by Mr. Malleret, the left hands of the third to the seventh are placed on the upper part of the left thigh—a convention lingering commonly in the later panels as well where not only these figures, but Rāhu, when he is emancipated from tourbillion, and rarely Soma poise their left palm on the thigh (rarely on the knee or the mount). The lower half of the body of Rāhu in this specimen and the major part of his body and of one of the arms in most of the specimens are engulfed by tourbillion which seems to represent *kundā* into which Rāhu should be placed according to the *Aparājita-prichchhā*⁴ and the *Rūpa-mandana*.⁵ According to the *Vishnudharmottara*⁶ Rāhu should be endowed only with an empty right hand, which may account for the covering of the left hand (in one case right hand covered leaving the left visible) in most of the panels of Cambodia. The single hand of Rāhu is sometimes empty but at times contains some objects including the moon as in many sculptures of India. The object in the hand of Ketu in most of the specimens has been recognized as a banner (one of the meanings of the word *ketu*), an attribute not prescribed in the texts consulted by me.

Though the reliefs of *nava-grahas* are rather prolific in India, very little work has been done on them. A very few of the sculptures have been examined and published and textual passages bearing on them hardly explored. So it is premature to say that the *grahas* with the identical *vāhanas* and attributes as found in the friezes of Cambodia and Champa are unknown in India, in text or in sculpture. Still a reference to the published texts⁷ available to me and panels in the museum-collections of Calcutta point out that there were varied traditions as regards the *vāhanas* and the attributes. Indeed, one of such traditions as recorded in the *Silparatnākara*⁸ (a modern compilation of various ancient texts) by N. M.

¹ T. A. Gopinatha Rao, *Elements of Hindu Iconography*, I, Part II (Madras, 1914), p. 321, and Appendix C, p. 96.

² Part II, ed. K. Samasiva Sastri, Trivandrum Sanskrit Series, No. XCVIII (Trivandrum, 1929), p. 173.

³ Jivananda Vidyasagarebattarya ed. (Calcutta, 1882), p. 815.

⁴ Gaekwad's Oriental Series, No. CXV (Baroda, 1950), p. 548.

⁵ Calcutta Sanskrit Series, No. XII (Calcutta, 1936), p. 10.

⁶ Gaekwad's Oriental Series, No. CXXX (Baroda, 1958), p. 195.

⁷ *Vide Table*, pp. 31-37.

⁸ (Dhrangadhra, 1939), p. 416.

Somapura actually specifies *gaja* (elephant) and *haya* (horse) as the respective *vāhanas* of Brihaspati and Sukra, the fifth and the sixth in the order of the traditional *grahas*. The horse has again been prescribed for Sukra in the *pariśiṣṭha* (based on texts not specified) appended to the *Vāstu-sāra-prakarana*¹ of Thakkura Pheru and in the *Dīpārṇava*.² In that case the fifth and the sixth figures of the panels of Cambodia and Champa may be identified with Brihaspati and Sukra on the basis of their mounts, not to speak of other considerations. The *vāhana* of Budha, the fourth *graha*, according to the *pariśiṣṭha* of this *Vāstu-sāra-prakarana*,³ is a *kala-hamṣa* which is the *vāhana* in most cases of the fourth in the panels of Cambodia and Champa. Among the friezes surveyed by Dr. Bhattacharya and Mr. Malleret the seventh usually rides a ram, but in at least two specimens (Bàyon No. 11 and Prâh Khân) Mr. Malleret has recognized a bull and identified them with Yama. The animal in the specimen from Prâh Khân is either a bull or a buffalo according to Dr. Bhattacharya who has recognized a bovine species in some more specimens as well. Now a buffalo is one of the several *vāhanas* ascribed to Sani by different texts.⁴ The attribute in the hand of the seventh figure in many of the friezes is a *dandā*, an attribute prescribed to Sani by a number of texts (*vide* Table).

The *vāhana* of the third figure in the series has been recognized in one case as a rhinoceros which looks doubtful, in another case a *mṛiga* which is again doubtful, a goose in one case, a goose or a peacock in one case, a beaked bird (identified with a parrot by Dr. Bhattacharya) in one case, a ram in two cases and a bovine animal in eleven cases. Among these *vāhanas*, only the ram is recognized as the *vāhana* of Mangala, the third *graha*, in the texts consulted by me. Looking at the friezes, one would wonder if there are some interchanges between the *vāhanas* of the third, where the bovine animal is in the majority, and the seventh, where a ram features in most cases. Or they are due to different traditions. In the sculptures noticed by me, Mangala, whose *adhidevatā* is Kārttikeya, has for his *vāhana* usually a peacock and rarely a *makara* or a heavy-bodied animal but the globular object (*mātulunga* (?)), which can be recognized in the hand of the third in several specimens of Cambodia, occurs in the hand of Mangala in some sculptures of eastern India.

A comparison of the prescriptions in the texts cited in the table (*see* pp. 31–37) with the iconographic features presented by some sculptures of the Calcutta-collections noticed above shows that the latter not only depart from the former in most cases but differ in some respects among themselves as well. Evidently these cross-currents are due to diverse traditions. Such being the case there is hardly any justification of clamping five *dikpālas* with four *grahas* because of the *vāhanas* which are again found mentioned in some texts with reference to the *grahas*, particularly when the *nava-grahas* are acknowledged in Cambodia.⁵

¹ Tr. Bhagvandas Jain (Jaipur, 1936), p. 173.

² Ed. P. O. Somapura (Palitana, 1960), p. 428.

³ Page 172.

⁴ In a few specimens like those from Añ Khnâ, Museum of Phnom Penh (b. 293) and Vat Pô Vâl (Battambang) the mount appears to be an equine animal like an ass which occurs as the mount of Sani in several panels of eastern India. But this identification cannot be emphasized on the basis of the photographs alone.

⁵ All the photographs, with the exception of those of the sculptures in the archaeological gallery of the Directorate of Archaeology of West Bengal, are the copyrights of the Archaeological Survey of India. I am thankful to the Director of Archaeology, West Bengal, not only for the supply of photographs but also for his permission to publish them. I am equally grateful to the Curator of the Asutosh Museum who has kindly permitted me to take photographs of his museum-exhibits and to publish them.

TABLE

	<i>Vishnudharmottara-purāna</i> , III, ed. Priyabala Shah, Gaekwad's Oriental Series, CXXX (Baroda, 1958), pp. 191-95	<i>Agni-purāna</i> , ed. Jivananda Vidyasagarabhattarya (Calcutta, 1882), Ch. 51, p. 136
Ravi	Four-armed Rashmi Rashmi Rashmi. On the head of Dandī ¹ (l.h.) Rashmi. On the head of Piṅgala (r.h.) Chariot with seven horses	Padma ⁴ Khaḍga
Soma	Four-armed Kumuda Kumuda Kānti on his right side Sobhā on his left side Chariot with ten horses	Kundikā Japyamālā
Māngala	Agnitulya ¹ Golden chariot with eight horses	Śakti Akshamālā
Budha	Vishṇutulya ² Golden chariot with eight horses	Chāpa Aksha ⁵
Bṛhaspati	Pustaka Akshamālā Golden chariot with eight horses	Kundi Akshamālā
Śukra	Nidhi Pustaka Silver chariot with ten horses	Kundi Akshamālā
Sani	Danda Akshamālā Iron chariot with eight serpents	Kinkini Sūtra ⁶
Rāhu	Right hand only (that, too, empty) ³ Silver chariot with eight horses	Ardhachandra
Ketu	Bhaumatulya Chariot with ten horses	Khaḍga Dipa

¹ The attributes of Agni are *jvālā* (flames) and *trisūla* in right hands and *askhamālā* and *Svāhā* (on left thigh).

² According to ch. 47, the attributes of the four-headed Vishnu are *chakra*, *gadā*, *lāṅgala*, *mushala*, *chāpa*, *vāṇa*, *charma* and *khaḍga*. According to ch. 44, *vāṇa*, *aksha*, *mushala*, etc., are in right hands and *charma*, *chīra*, *dhanu*, etc., in left hands of the eight-armed god on Garuḍa. According to ch. 60 Vishnu has one face and two arms with *gadā* and *chakra*.

³ Gopinatha Rao's quotation provides in the hands of Rāhu *kambala* and *pustaka*, the reading *kambalam* *pustakam* *kāryam* being evidently a misreading for *kevalam* *mastakam* *kāryam*.

⁴ *Charma*, a variant reading noted in the Bibliotheca Indica edition (cf. Marie-Thérèse de Mallmann, *Les Enseignements Iconographiques de l'Agni-purāna* (Paris, 1963), p. 82, note 1).

⁵ *akshamālā*, a variant reading in the Anandāśrama ed. (cf. *ibid.*, p. 82, note 1).
⁶ *Sikhini*, variant reading in the Bibliotheca Indica ed. (cf. *ibid.*, note 1).

TABLE (contd.)

	<i>Agni-purāna</i> , Ch. 120, pp. 347-49. The <i>vāhanas</i> here have practically no relation with iconography and pertain to the description of the dimensions, movements, situations of the <i>grahas</i> , of which a fuller description occurs in the <i>Vishnu</i> -, <i>Vāyu</i> -, <i>Matsya-purānas</i> , etc.	<i>Agni-purāna</i> , Ch. 299, p. 815. Probably this arrangement is when the <i>grahas</i> are arranged in <i>mandala</i> with Sūrya in the centre	<i>Svaratna of Śrī Kumāra</i> , Part II, ed. K. Sambasiva Sastry, Trivandrum Sanskrit Series, No. XCIVIII (Trivandrum, 1929), p. 173
Ravi	Single-wheeled chariot with seven horses representing <i>chhandas</i> like <i>gāyatri</i> , etc.	Padma Padma <i>Padmāsana</i>	Red lotus Red lotus Abhaya Varada Red lotus
Soma	Three-wheeled chariot with ten white horses	Abhaya (r.h.) On the left thigh (l.h.)	Abhaya (r.h.) On the left thigh (l.h.)
Mangala	Chariot with eight horses	do.	do.
Budha	Chariot with eight horses	do.	do.
Bṛihaspati	Chariot with eight horses	do.	do.
Śukra	Chariot with eight horses	do.	do.
Śani	Chariot with eight horses	do.	do.
Rāhu	Chariot with eight horses	do.	Karāhitāñjaliyuk
Ketu	Chariot with eight horses	do.	Abhaya (r.h.) On the left thigh (l.h.)

TABLE (contd.)

	<i>Matsya-purāṇa</i> , ed. Panchanana Tarkaratna, Bangavasi edition (Calcutta, 1816), p. 285	<i>Mānasollāsa of King Somesvara II</i> , ed. G. K. Shrigondékar, Gaekwad's Oriental Series, LXXXIV (Baroda, 1939), pp. 71-73	<i>Sūtradhāra-Manda-na's Devatāmūrtiprakarana</i> , ed. Upendra Mohan Sankhyatirtha, Calcutta Sanskrit Series, XII (Calcutta, 1936), pp. 69-71
Ravi	Padma Padma Seven horses	Padma Padma Chariot with seven horses	
Soma	Gadā ¹ Vara White horse	Gadā (r.h.) Vara (l.h.) Chariot with ten white horses	Gadā (r.h.) Vara (l.h.) Chariot with ten white horses
Maṅgala	Śakti Śūla Gadā ¹ Vara 1	Vara (l.r.) Śakti (u.r.) Śūla Gadā Mesha	Vara (l.r.) Śakti (u.r.) Śūla Gadā Mesha
Budha	Khadga Charma Gadā ¹ Vara Simha	Vara Khadga Khetaka Gadā ¹ Simha	Vara Khadga Khetaka Gadā ¹ Simha
Bṛhaspati	Danḍa Vara Aksha-sūtra Kamandalu	Vara Aksha-sūtra Kamandalu Danḍa	Vara Aksha-sūtra Kamandalu Danḍa
Śukra	Danḍa Vara Aksha-sūtra Kamandalu	Vara Aksha-sūtra Kamandalu Danḍa	Vara Aksha-sūtra Kamandalu Danḍa
Sani	Śūla Vara Vāna Vāṇasana Grīdhra	Vara Vāna Chāpa Śūla Grīdhra	Vara Vāna Chāpa Śūla Grīdhra
Rāhu	Khadga Charma Śūla Vara Simhāsana	Vara Khadga Khetā Śūla Simhāsana	Vara Khadga Khetā Śūla Simhāsana
Ketu	Gadā ¹ Vara Grīdhra	Vara Gadā ¹ Grīdhra	Vara Gadā ¹ Grīdhra

¹ According to a reading quoted by T. A. Gopinatha Rao in the *Elements of Hindu Iconography*, I, Part II (Madras, 1914), Appendix C, p. 94, and also according to the quotation in the *Journ. Ind. Soc. Oriental Art*, XVI (1948), p. 96, the *vāhana* is *mesha*. The reading here is *meshagamo* in place of *śvetaromā* of the Bangavasi edition. In this connection it may be noted that there is an interchange of *ślokas* describing Ravi, Soma and Maṅgala between *Matsya-purāṇa* and the *Vishṇudharmottara* as quoted by Gopinatha Rao. Surya is on a chariot of seven horses according to the quotations of Gopinatha Rao and *Journ. Ind. Soc. Oriental Art*, the latter having for Soma a chariot of ten horses.

TABLE (*contd.*)

	<i>Silparatna of Sri Kumāra</i> , Pt. II, ed. K. Sambasiva Sastry, Trivandrum Sanskrit Series (Trivandrum, 1929), pp. 171-73	<i>Silpa-ratnākara</i> by N. M. Somapura (Dhrangadhra, 1939), pp. 415-17	<i>Iśanāśivagurudeva-paddhati</i> , Part III, ed. T. Ganapati Sastry, Trivandrum Sanskrit Series, LXXVII (Trivandrum, 1922), pp. 101 and 102
Ravi	Padma Padma Chariot with seven horses	Śveta pañkaja Śveta pañkaja Śaptamukhahayaiḥ-yukta ratha	Padma Padma or Śūla
Soma	Gadā (r.h.) Vara (l.h.) Chariot with ten white horses	Gadā (r.h.) ¹ Vara (l.h.) Chariot with ten white horses	Padma or Gadā Padma or Vara White horse or chariot with ten horses
Māngala	Vara (l.r.h.) Śakti (u.r.h.) Śukla (Śūla ?) Gadā ¹ Mesha	Vara (r.h.) Śakti (r.h.) Śūla (l.h.) Gadā (l.h.) Mesha	Vara Śakti Śūla Gadā Mesha
Budha	Vara Khadga Khetaka Gadā ¹ Simha	Vara ¹ Khadga Khetaka Gadā ¹ Simha	Vara Khadga Charma Gadā ¹ Simha
Bṛihāspati	Vara Aksha-sūtra Kamaṇḍalu Danḍa	Vara Aksha-sūtra Danḍa Kamaṇḍalu Gaja	Danda Akshasrag Vara Kuṇḍikā Golden chariot
Sukra	Vara Aksha-sūtra Kamaṇḍalu Danḍa	Aksha-sūtra Danda Pāsa Kamaṇḍalu Haya	Danda Akshasrag Vara Kuṇḍikā Silver chariot
Śani	Vara Vāma (Vāṇa ?) Chāpa Śūla Gṛidhra	Vara Vāna Chāpa Jala (Śūla ?) Mahisha	Śūla Vara Ishu Chāpa Gṛidhra
Rāhu	Vara Khadga Kheta Śūla Simhāsana		Śūla Khadga Charma Vara Nilaiḥ hariviraiḥ ratha
Ketu	Vara Gadā ¹ Gṛidhra	Vara Gadā ¹ Sarpapuchchhākṛiti	Gadā ¹ Vara Gṛidhra

¹ Verses describing Soma and Budha are almost identical with those of the *Mānasollāsa*, *Devatāmūrtiprakarana* and *Silparatna*.

TABLE (contd.)

	<i>Bhubana-pradīpa</i> ¹ as quoted by Nirmal Kumar Bose in <i>Canons of Orissan Architecture</i> (Calcutta, 1932), p. 176	<i>Aparājita-prichchhdā</i> of Bhuvanadeva, ed. P. A. Mankad, Gaekwad's Oriental Series, CXV (Baroda, 1950), pp. 547-48	<i>Sūtradhāra-Mandana's Rūpa-maṇḍana</i> , ed. Upendra Mohan Sankhyatirtha, Calcutta Sanskrit Series, XII (Calcutta, 1936), p. 10
Ravi	Padma Abhaya Chariot with seven horses and a single wheel	White pāṅkaja White pāṅkaja Chariot with seven horses	White pāṅkaja White pāṅkaja Chariot with seven horses
Soma	Gadā	Kamala Kamala Chariot with ten horses	Padma Padma Chariot with ten horses
Mangala	Śakti Śūla Gadā Vara	Danda Kamandalu Mesha	Danda Kamandalu Mesha
Budha	Khadga Charma Gadā Vara	Yogāsana Sarpāsana	² Sarpāsana
Bṛhaspati	Danda Vara Aksha-sūtra Kamandalu	Aksha Kamandalu Hamsa	² Hamsa
Śukra		Aksha Kamandalu Dardura	² Bheka
Śani	Śūla Vara Dhanus Gadā ² Grīdhra (?)	Danda Kamandalu Mahisha	² Mahisha
Rāhu	Khadga Charma Śūla Vara	Kuṇḍa-madhyaga	Kuṇḍasya-madhyaga
Ketu	Gadā Vara	Karapuṭākṛiti Sarpapuchchhākṛiti	Karapuṭākṛiti Sarpapuchchhākṛiti

¹ The attributes provided in this text on Orissan architecture are evidently according to the prescription of the *Matsya-purāṇa*, but usually do not conform with those in the hands of the *grahas* on the architraves of most of the temples of Orissa..

² Evidently two lines have been omitted in this edition. According to these lines, as quoted by T. A. Gopinatha Rao in his *Elements of Hindu Iconography*, I, Pt. II, Appendix C, p. 91, Budha is in *yogāsana*, Bṛhaspati is with *aksha* and *kamandalu*, Śukra is with *aksha* and *kamandalu* and Śani is with *danda* and *kamandalu*. Verses describing the attributes and *vāhanas* are almost identical in the *Aparājita-prichchhdā* and *Rūpa-maṇḍana*.

TABLE (contd.)

	<i>Thakkura Pheru's Vāstu-sāra-prakarana</i> , tr. Bhagavandas Jain, Jaina Vividha Granthamala, pushpa 3 (Jaipur, 1938), Parīśiṣṭā (based on texts not specified), pp. 172-74	<i>Nirvāṇa-kalikā</i> as quoted by Bhagavandas Jain in his translation of <i>Thakkura Pheru's Vāstu-sāra-prakarana</i>	<i>Dīpārṇava</i> , ed. P. O. Somapura (Palitana, 1960), pp. 425-29
Ravi	Kamala		Śvetapañkaja
	Saptāśva-ratha		Saptāśva-ratha
Soma	Sudhā-kumbha	Aksha-sūtra (r.h.) Kuṇḍī (l.h.)	Padma Amṛita-ghaṭa
	Śvetadaśavāji		Daśāśva-ratha
Maṅgala	Kuddāla	Aksha-sūtra (r.h.) Kuṇḍī (l.h.)	Danda Kamaṇḍalu
	Bhūmīsthita		Meṣha
Budha	Pustaka	Aksha-sūtra Kuṇḍikā	Aksha-sūtra Kuṇḍikā
	Kala-hamṣa		Siṁhāsana
Bṛihaspati	Pustaka	Aksha-sūtra Kuṇḍikā	Akshamālā Pustaka
	Hamṣa		Hamṣa
Śukra	Kumbha	Aksha-sūtra Kamaṇḍalu	Akshamālā Kamaṇḍalu
	Turaga		Āśva
Śani	Paraśu	Aksha-sūtra Kamaṇḍalu	Danda Kamaṇḍalu
	Kamaṭha		Maha-mahisha
Rāhu	Paraśu	Argha-mudrā	
	Siṁha		Siṁha
Ketu	Pannaga	Aksha-sūtra Kuṇḍikā	Kara-puṭa
	Pannaga		Sarpapuchchhākṛiti

TABLE (concl.)

	<i>Nishpanna-yogavali</i> , ed. B. Bhattacharya, Gaekwad's Oriental Series, CIX (Baroda, 1949), pp. 62-63
Ravi	Padmastha-sūryamaṇḍala Padmastha-sūryamaṇḍala Sapta-turaga-ratha
Soma	Kumudastha-chandramāṇḍala Kumudastha-chandramāṇḍala Hamsa
Maṅgala	Katṭāra (r.h.) Mānuṣha-muṇḍa ¹ (l.h.) Chhāgala
Budha	Śara Dhanus Padma
Bṛihaspati	Aksha-sūtra Kamāṇḍalu Bheka or kapāla
Śukra	Aksha-sūtra Kamāṇḍalu Kamala
Śani	Danda Kaohchhapa
Rāhu	Sūrya (r.h.) Chandra (l.h.)
Ketu	Khadga Nāgapāśa

¹ In the pose of eating the muṇḍa.



FIG. 1. Four *griffas*, Sarnath (now in the Indian Museum).



FIG. 2. Nine *graha*s, Gaur (now in the Indian Museum).

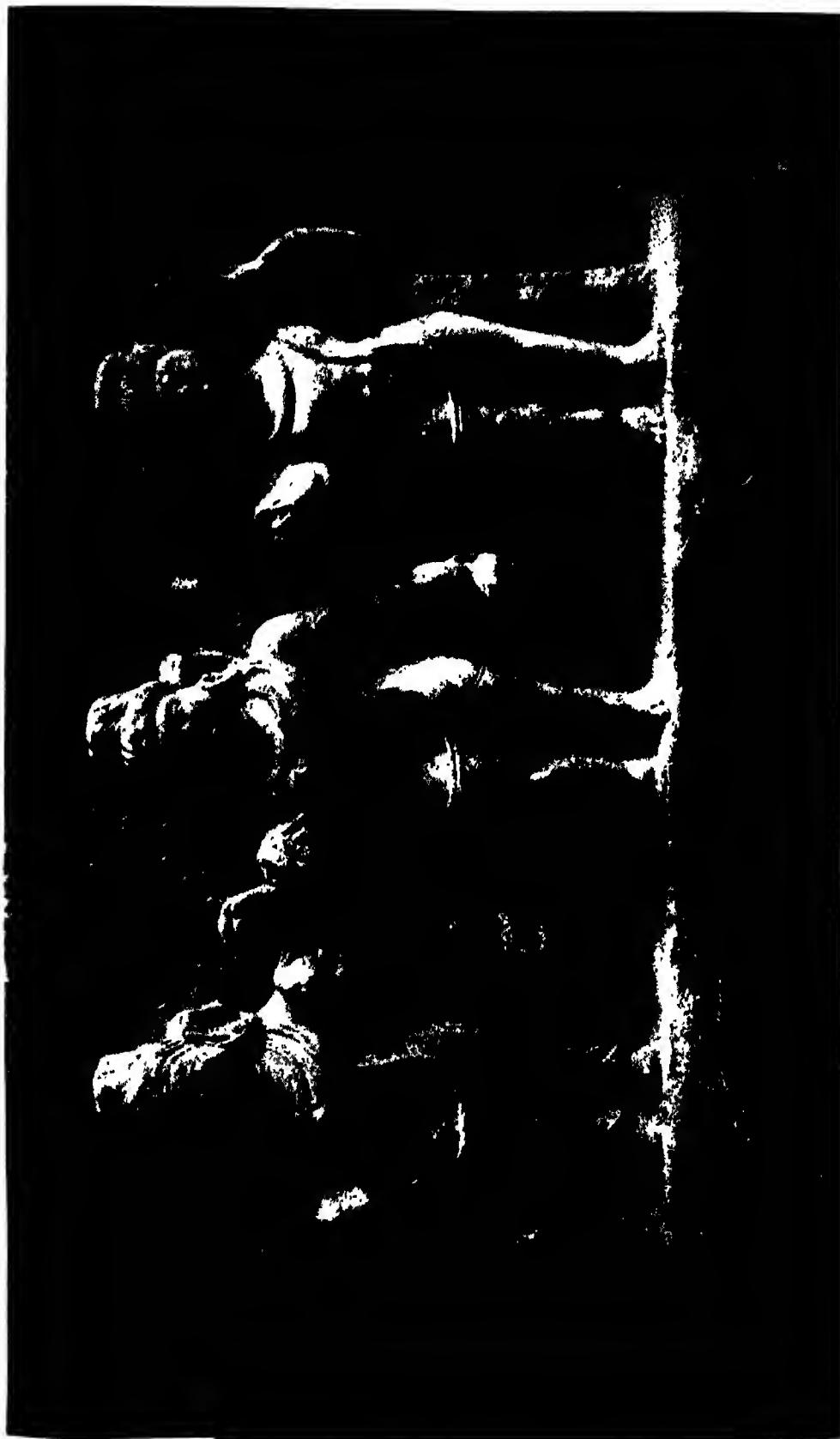


FIG. 3. Three *grahas*, Bihar (now in the Indian Museum).



FIG. 4. Nine *grahus*, Taldaha (now in the Asutosh Museum).



FIG. 5 Nine *grahas*, Bihar (now in the Indian Museum).



FIG. 6 Nine *apthas* (now in the collection of the Directorate of Archaeology, West Bengal)

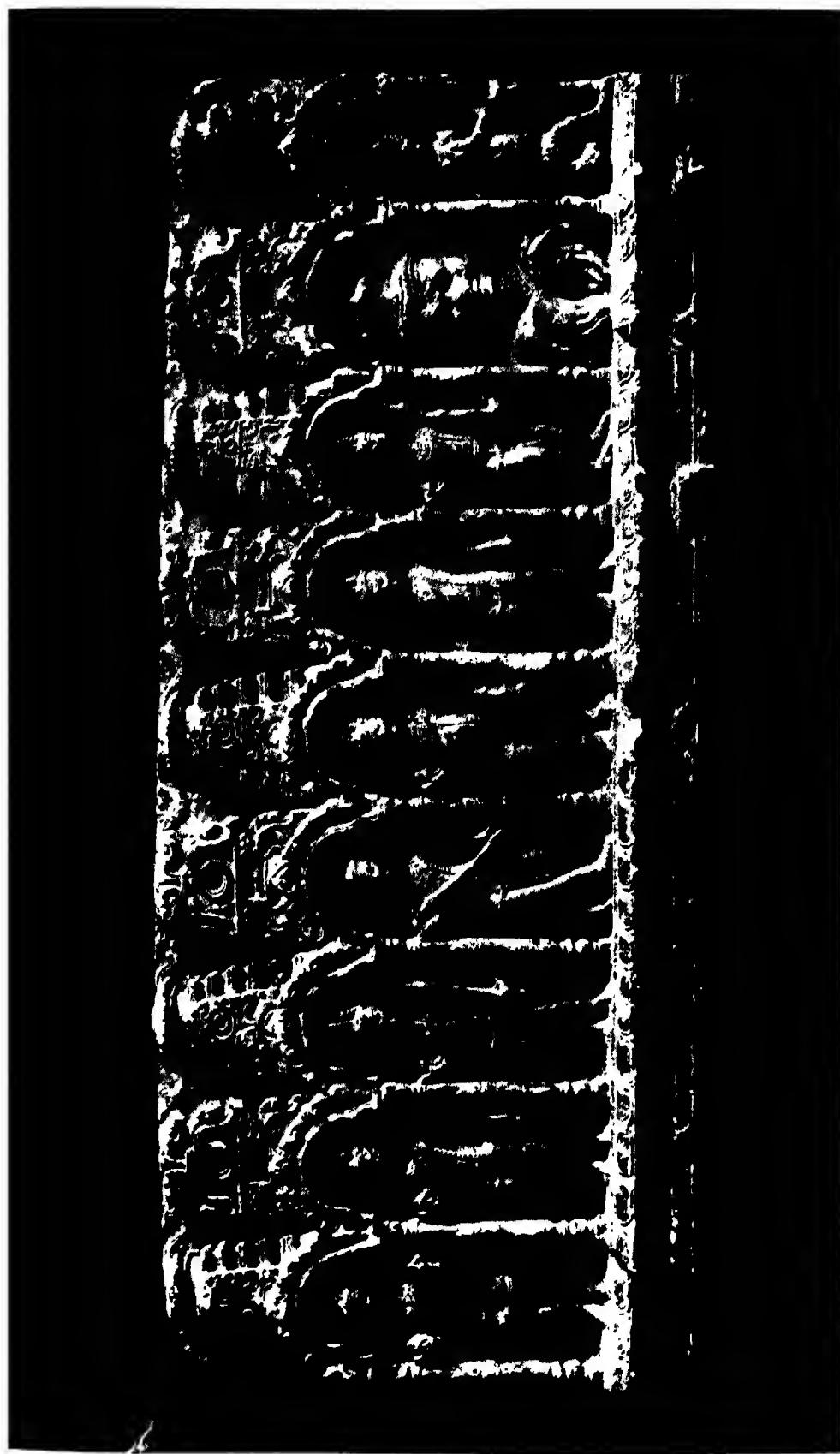


FIG. 7. Nine *gopis*, Bihar (now in the Indian Museum)



FIG. 8. Nine reliefs with Ganesa. Below them in the Vastash Museum.



Fig. 9. *Nimavata* with Ganesa. Rankandighi (now in the Asmuchi Museum).



FIG. 10 Nine *marcas* with Chinese Bangzi-hou (the collection of the Directorate of Archaeology, West Bengal)



FIG. 11 Nine *orthis* with *Glycinea*, North Bengal (now in the Asutosh Museum)



12. Nine *nakas* with Ganesa. Mallarpur (now in the collection of the Director of Archaeology, West Bengal).

Directorate





FIG. 14. Some *qatras* with *grana*, and other ornaments of Vishnu Bhairava now in the Indian Museum.



FIG. 15. Some *qatras* with *grana*, and other ornaments of Vishnu Bhairava now in the Indian Museum.

PLATE XIV

JAS. VII. 1965.



Fig. 11. Middlemost tier of the Sarnath group, Bhadravati (now in the State Museum of Orissa).



Fig. 17. Stupa with nine *gandharvas* and other deities. - Khaputale (now in the Jardine Museum).



Fig. 18. Stupa with nine *gandharvas* and other deities. - Khaputale (now in the Jardine Museum).

PLATE XVI.

JAS. VII. 196



FIG. 19. Nine *grahas*. Khammam, now in the Andhra Museum.



Fig. 20 Nine *nātakas* with other deities, Lakshmana temple, Khajuraho



FIG. 21.—*Spiriferites*, Rich, now in the collection of Sagan University

PHONEMES OF A DACCA DIALECT OF EASTERN BENGALI
AND THE IMPORTANCE OF TONE

By ANIMESH K. PAL

CONTENTS

	<i>Page</i>
1. Dialects of Dacca	39
2. Origin of the phonetical peculiarities of the dialect	39
3. Description of the vowel sounds	40
4. Description of the consonant sounds	41
5. Description of the allophones	41
6. The sounds and their signs	41
7. The actual occurrence of the sounds (consonants)	42
8. The actual occurrence of the sounds (vowels)	43
9. The actual occurrence of the sounds (allophones)	43
10. The diphthongs	43
11. The triphthongs	44
12. Other vowel combinations	44
13. Importance of tone	44
14. Tone and voiced aspirates	46
15. Tone and unvoiced aspirates	46
16. Tone and aspirates in final position	48

1. DIALECTS OF DACCA

According to the classifications of Professors S. K. Chatterjee and Sukumar Sen dialects of Dacca are included among the Bangāli or Vanga dialect of Bengali language. But Bangāli dialect is not a homogeneous unit. The District of Dacca, too, is not homogeneous as far as dialects are concerned. This district is divided into four subdivisions for the administrative purpose. These are: Dacca Sadar, Narayanganje, Munshiganje and Manikgunje. Roughly speaking, these four administrative subdivisions follow a rather topographical pattern. These are more or less separate geographical units. These four administrative subdivisions may as well be accepted for the purpose of dialectal study. Thus Manikgunje, Munshiganje and Narayanganje are three dialectal units. While Sadar subdivision and Narayanganje subdivision are practically one unit, the dialect of the city of Dacca is distinctively different from the other three. The latter has changed considerably because of the exchange of population. For the present purpose I shall depend upon one of these dialects, viz. that of Narayanganje, which is my mother tongue and which we still use among ourselves at home.

2. ORIGIN OF THE PHONETICAL PECULIARITIES OF THE DIALECT

Let me begin with the most remarkable phonetic characteristic of this dialect, which may preferably be described as spirantization. There is, possibly, a general tendency of spirantization observable to some extent in almost all the Eastern Bengali dialects. The dialect spoken in Chittagong district is the most peculiar in this respect. Many of the phonetic peculiarities of the Eastern Bengali dialects originate from this phenomenon. Professor Chatterjee commented in his *Kirāt-Jāna-Kṛti* that 'in the development of the Aryan-Assamese language (as much as of Khas-Kura or Gorkhali and to some extent of Bengali, particularly in its Eastern dialects) the

influence of the Bodo and Naga as well as the late Ahom language is noticed'. Professor Chatterjee then listed the probable Tibeto-Burman influences on Assamese in respect of its phonetical characteristics. It is interesting to note that the following two phenomena are suggestive of Tibeto-Burman influence on Assamese—'The dentalization of the palatal affricates of 'c, ch' to 's' and of 'j, jh' to 'z' and the change of 's' to 'h' and then to 'x', the guttural unvoiced spirant, like the Persian sound as in 'khudā' (= xudā), 'khush' (= xuš), etc.'

The above-mentioned observations on Assamese may be accepted for the dialect under investigation except the last one. Now, dentalization of the palatal affricates and the change of 's' to 'h' are the results of a general tendency of spirantization. Thus, this tendency, which is the influence of the neighbouring Tibeto-Burman speech-communities, is at the root of many important phonetic divergences.

There is yet another very important phenomenon related to the phonemic structure of this dialect which I like to describe as a rising tone. It is very important and interesting to note that this rising tone is a vowel attribute and mostly compensatory in nature, especially in regard to dispiration of the aspirates. While the unvoiced aspirates remain unchanged initially they may change to 'h' or to a voiced stop non-initially. But because of the aforesaid compensatory device the voiced aspirates in all positions are found just as voiced stops, and voiced fricative plus a rising tone on the immediate vowel. Professors Chatterjee and Sen considered these phones as glottal recursives. But repeated observations have fully convinced me that this has got nothing to do with the consonants themselves but is connected with the vowels whether following or preceding and is compensatory in nature.

The same thing happens when the unvoiced aspirate is disaspirated in intervocalic or final positions. This, I propose to indicate with a capital 'V' sign which will be put at the end of the syllable having a rising tone.

There are some more phonetic peculiarities of this dialect which may not be disputed and are quite minor in nature. These are : (1) A preference for the open vowels and thus 'e' becoming 'ae' if it is not checked by closed vowels 'i' and 'u'. (2) A tendency of pronouncing the vowels laxly and thus 'u' often becoming 'o' and vice versa, so also 'e' becoming 'ae' and vice versa.

3. DESCRIPTION OF THE VOWEL SOUNDS

However, we may now describe the vowel sounds used in this dialect. There are two closed vowels: one, front 'i' and the other, bi-labial 'u'. There are two half-closed vowels: one, front 'e' = 'E', and the other, bi-labial 'o'. There are two half-open vowels: one, front 'ae' = 'A', and the other, bi-labial 'ɔ' = 'O'. Lastly, there is an open central vowel 'a'. These seven vowel phonemes are mostly like those of the standard colloquial Bengali, except that they are never nasalized and that they are lengthened not only by means of stress but also by means of a rising tone which is observable mostly in the first syllables. In addition to these seven vowels two more vowel sounds should also be considered here. One of them is a half-closed-back-vowel, an allophone of the 'o' phoneme and is found in such combinations as o'nil, o'ti, etc. Another is an allophone of the 'ae' = 'A' phoneme. It is an open front vowel and nearer to cardinal vowel 'a'. This occurs finally in such so-called epenthetic words as raikkha', ko'ira', etc., only. I propose to use an apostrophe after 'ɔ' and 'a' for these two sounds respectively (= o', a').

4. DESCRIPTION OF THE CONSONANT SOUNDS

Now we may describe the consonant sounds of this dialect. There are altogether eight stops or plosives. These are : 'k, g, t, d, t̪ = T, d̪ = D, p, b'. The first two of these are velars, first unvoiced, latter voiced. The next two are dentals in the same order. The next two are retroflexes in the same order. The last two are bi-labials. Their order is same but the unvoiced one is found to be slightly spirantized in the speech of some individuals using this dialect. There are three nasals; viz. 'm, n, ñ = N'. The first one is a bi-labial, the second an alveolar and the third a velar. There is a dental affricate 'ts' = C. There are four fricatives, viz. one dental 's', one alveolar 'z', one alveo-palatal 'ʃ' = S, one glottal 'h' = H. There is one lateral alveolar sound 'l' and a flapped alveolar sound 'r'. Thus we find 18 consonants in this dialect.

Added to these we must now consider the aspirates. Professors Chatterjee and Sen found five glottal recursives in the Eastern Bengali dialects in the place of the voiced aspirates. As far as this dialect is concerned, there are only voiced stops, etc., with a following or preceding rising tone on the immediate vowel in such cases. This, I shall take up later. But the case with the unvoiced aspirates is different. There is an unvoiced velar aspirated stop 'kh'. It generally occurs initially in a word. A slight tendency towards spirantization of this phone is observable in the speech of certain individuals using this dialect. There is one aspirated unvoiced retroflex stop 'th' = Th. This also occurs initially in a word. An aspirated unvoiced dental stop 'th' is also there. This, too, occurs initially. Lastly, we come to the aspirated unvoiced bi-labial fricative 'F'. This is a case of spirantization. Before this description is completed the dental fricative 's' should again be considered as it corresponds to 'ch' sound of the standard colloquial Bengali which is an unvoiced aspirated alveo-palatal affricate. In the final and other positions this sound is devoid of any kind of aspiration but in the initial and inter-vocalic positions the dispiration is compensated by a rising tone just as in the cases of voiced aspirates. Lastly, there is a palatal semi-vowel 'e'. This sound is identical with that of the standard colloquial Bengali.

5. DESCRIPTION OF THE ALLOPHONES

Now we may take up the consonantal allophones. The two vowel allophones have been considered earlier. There is a guttural unvoiced fricative 'x'. This occurs when the unvoiced velar stop is spirantized. There is one labio-dental fricative 'f'. It occurs when the bi-labial unvoiced stop 'p' is spirantized. The alveo-palatal unvoiced affricate 'sf' = c is found only in non-initial positions and as a doubled consonant. This is an allophone of the dental affricate 'ts' = C. The alveo-palatal voiced affricate 'ʒ' = j, too, is found only in non-initial positions and as a doubled consonant. This is an allophone of the alveolar fricative 'z'. Same is the case with alveo-palatal unvoiced aspirated affricate 'ɛʃh' = ch. This is an allophone of the dental fricative 's'.

6. THE SOUNDS AND THEIR SIGNS

In order to overcome the limitations of a common typewriter certain departures from the International Phonetic Transcription are essential. But this will be done only when it will be imperative and even then to the nearest approximation of the correct sign. The proposed changes have

already been indicated after putting ' = ' sign to the regular phonetic signs during the description of the sounds. The total 37 sounds used in this dialect are as follows:

k, g, t, d, T, D, p, b, m, n, N, C, z, s, S, H, l, r, kh, th, Th, F,
e, u, o, O, A, E, i, a, o', a', x, f, c, j, ch.

The rising tone will be indicated with a capital V after the vowel on which the tone exists.

7. THE ACTUAL OCCURRENCE OF THE SOUNDS (CONSONANTS)

Now let us examine each one of these sounds and find out how they occur actually in this dialect.

1. *The stops.*—Velar unvoiced stop 'k', as in kaHa, occurs initially; as in bAkka it occurs non-initially but it seldom occurs non-initially not being doubled. In monosyllabic words such as nak and Dak it is found in final positions also. Velar voiced stop 'g' may occur both initially and non-initially as in gadaV, saVgOl, lag, goSa, gia, bagiCa, etc. Dental unvoiced stop 't' may occur both initially and non-initially as in tani, bataS, ko'tu, bo'utta, etc. Dental voiced stop 'd' may occur both initially and non-initially as in dam, dada, OVddO, bad, etc. Retroflex unvoiced stop 'T' occurs mostly initially as in TAHa, Tin, TunDa, ToFa, Tila, Tikka, etc. When it occurs non-initially we find it as a doubled consonant as in ThaTTa. Retroflex voiced stop 'D' occurs both initially and non-initially as in Dail, Dula, Dusi, Dol, kaDa, KaDol, etc. Bi-labial unvoiced stop 'p' occurs initially as in pata, put, pisaV, pEtni, etc. It may be found in non-initial positions and doubled in such words as thappOr, bappo'iS, etc. It is found finally in such monosyllabic words as Cup, baVp, map, and so on. Bi-labial voiced stop 'b' may occur initially or non-initially as in bammoA, baba, gabOr, gOrbo'ti, etc.

2. *The nasals.*—Bi-labial nasal 'm' occurs both in initial and non-initial positions such as in mas, mama, mila, kam, etc. Alveolar nasal 'n' occurs both in initial and non-initial positions such as nafit, kandon, magna, daVn, etc. Velar nasal 'N' can occur only in non-initial positions such as bAN, DaN, DoNa, DiNi, ziNa, DaNOr, etc.

3. *The affricate.*—Dental affricate 'C' occurs initially in a word such as Camra, Cup, Calak, CiOl, CAga, etc. It may occur in non-initial positions, too, such as baCa, kaCa, biCar, etc. It is not found in final position.

4. *The fricatives.*—Alveolar fricative 'z' occurs both initially and non-initially as in zam, zOntrOna, ziga, zuit, bazna, kObza, laz, etc. Dental fricative 's' occurs both initially and non-initially as in kas, saVr, bisaV, bistOr, etc. Alveo-palatal fricative 'S' occurs both initially and non-initially as in SidaV, So'i, Saban, biSSaS, SObbA, etc. Glottal fricative 'H' occurs both initially and non-initially as in HOgOl, kaHa, SaHOS, etc. But it does not occur finally in a word.

5. *The lateral.*—Alveolar lateral 'l' occurs both initially and non-initially as in laz, ailam, ko'ilO', COl, etc.

6. *The flapped.*—Alveolar flapped 'r' occurs both initially and non-initially as in rait, baerA, bOrO, goVra, tOr, gOVr, etc.

7. *The aspirates.*—Velar unvoiced aspirated stop 'kh' occurs mostly initially as in khaDaS, kharO, khAtO, khofa, etc. But in such a rare combination as kharakkhra it is found in non-initial position. Dental unvoiced aspirated stop 'th' occurs only initially as in thamba, thubraia, thal, etc. Retroflex unvoiced aspirated stop 'Th' occurs only initially as in ThAla, Thila, ThaTTa, Thola, ThEli, etc. Bi-labial unvoiced aspirated

fricative 'F' occurs both initially and non-initially as in Fala, Ful, FuDani, FEucca, bOrOF, FOrFOR, Fira, etc.

8. *The semi-vowel*.—Palatal semi-vowel 'e' occurs finally in a word in combination with 'O, a, o, A', such as Oe, ae, doe, dAe, etc. It can also occur as an intervocalic glide as in kOeDa.

8. THE ACTUAL OCCURRENCE OF THE SOUNDS (VOWELS)

Bi-labial closed vowel 'u' occurs both initially and non-initially as in uDan, bo'u, HudaHudi, etc. Bi-labial half-closed vowel 'o' occurs initially and medially in such words as oSSa, oDa, koDa, Hona, etc. It occurs finally in a word only in combination with three other vowels, viz. 'A, O, a' as in khao, zao, bOo, Oo, dAo, nAo, etc. Bi-labial half-open vowel 'O' occurs both initially and non-initially as in OSanti, Oga, bOlOd, bOrO, etc. Central open vowel 'a' occurs both initially and non-initially as in amra, amar, etc. Frontal half-open vowel 'A' occurs both initially and non-initially as in AkTa, kADA, DaHA, etc. Frontal half-closed vowel 'E' occurs both initially and non-initially as in Edige, HEdige, bo'isE, etc. Frontal closed vowel 'i' occurs both initially and non-initially as in iT'Tn, bilati, biCi, ko'isi, etc.

9. THE ACTUAL OCCURRENCE OF THE SOUNDS (ALLOPHONES)

1. *Consonantal allophones*.—Guttural unvoiced fricative 'x' is not a very stable sound. It occurs only intervocally such as in Thaxur, Mexur, DEVxur, bo'ixal, etc. Labio-dental unvoiced fricative 'f', too, is not very stable. It also occurs only intervocally such as in ufrE, kafOr, naft, etc. Alveo-palatal unvoiced affricate 'c' is found as a doubled consonant and, as such, in intervocalic position, viz. bacca, khaccOr, etc. Alveo-palatal unvoiced aspirated affricate 'ch', in the same way, is found being in combination with 'c' and, as such, only in intervocalic position, viz. iccha, gauecha, 'mancecha', etc. Alveo-palatal voiced affricate 'j' occurs intervocally and as a doubled consonant as in bOjjat, nAjjO, lazlOjja, kaijja, etc.

2. *Vowel-allophones*.—Back half-closed vowel 'o' occurs both initially and non-initially but always in proximity of either 'i' or 'u' such as in o'ilō, bo'i, bo'u, Ho'ur, dio', o'ti, etc. Frontal open vowel 'a' occurs only finally in a word of so-called epenthetic origin. Either 'i' or 'n' is found in the penultimate syllable of those words such as gauecha', leikkha', Eugga', maigga', Khaujja', paucca', bainda', Hainda', etc.

10. THE DIPHTHONGS

The vowels need further consideration as the combination of two and more vowels may reveal some of the peculiarities of the sound system of this dialect. The following diphthongs are found in it:

1. u- ui- as in dui, uE- as in FuE, ua- as in kua, uO- as in HuOr.
2. o- oa- as in Hoa, moa, oe- as in doe, thoe, etc.
3. O- Oo- as in Oo, bOo, Oe- as in Oe, kOe, etc.
4. o'- o'i- as in bo'i, ko'i, o'u- as in bo'n, lo'u, etc.
5. a- au- as in lau, ao- as in khao, ai- as in khai, ae- as in zae, aA- as in mta, but there may be a semi-vowel 'e' glide in between the two vowels and thus maeA is also heard.
6. i- iu- as in biun, io'- as in dio', ia- as in dia, iE- as in kiEr, etc.
7. E- Ei- as in HEiDa, Eu- as in FEura, etc.

8. A- Ac- as in HAe, Ao- as in dAo, AO- as in kAO, Aa- as in CAar, etc.

Thus the number of diphthongs used in this dialect are 25 in total. Let us now consider the triphthongs as they practically occur in this dialect.

11. THE TRIPHTHONGS

The following triphthongs are found in it:

1. uo'i- as in Huo'ira, uia- as in thuia, uai- as in Fuai, uao- as in Fuao, uae- as in Fuae, etc.
2. oan- as in boai, oao- as in boao, oae- as in boae, etc.
3. Ooa- as in SOoa, Oea- as in nOea, Oeo'- as in kOeo', Ooo'- as in kOoo', etc.
4. o'ia- as in lo'ia, o'io'- as in lo'io', etc.
5. aia- as in maia, aio'- as in zaio', aiO- as in naiOr, aua- as in kaua, aiE- as in aiE, aoa- as in baoa, aoO- as in naoO, ao'i- as in ao'i, aoA- as in paoA, etc.
6. iai- as in Hiae, iae- as in Hiae, iao- as in Hiao, iaO- as in gjaO, etc.
7. Eua- as in Deua, Eo'i- as in SEo'i, EiO- as in EiOVDA, etc.
8. Aai- as in bAai, Aoa- as in dAoal, AeO- as in HAeO, etc.

12. OTHER VOWEL COMBINATIONS

1. *Combination of four vowels.*—uaia- as in Fuaia, oia- as in boaia, Oia- as in bOaia, iaia- as in biaia, uEo'i- as in FuEo'i, aAo'i- as in maAo'i, uOo'i- as in gaOo'i, uao'i- as in kuao'i, AeO'i- as in HAeO'i, Ooao- as in kOoao, Ooai- as in kOoai, Ooac- as in lOoae, Aoai- as in khAoai, Aoao- as in dAoao, Aoae- as in dAoae, aoai- as in khaaoai, uoao- as in khaaoao, oaoe- as in khaaoae, Euao- as in DEVuao, Euai- as in DEVuai, Euac- as in DEVuae, etc.

2. *Combination of five vowels.*—aoaia- as in khaaoaia, aoaio'- as in khaaoao', Aoia- as in khAoia, Aoao'- as in khAoao', Ooia- as in lOoia, Ooao'- as in lOoao', Euia- as in DEVuaia, Euao'- as in DEVuaio', etc.

Apart from these combinations certain other matters need consideration as a few other peculiarities are also observable in the behaviour of the component sounds of certain combinations under different conditions. But we shall leave it out for the present.

13. IMPORTANCE OF TONE

From the description of the phonemes of this dialect it is quite clear that tone plays a very important role here. We shall now consider the actual occurrence of this tone and also other relevant points. It is a well-known fact that in the standard colloquial of Bengali language 'stress is not significant, i.e. presence or absence of it does not alter the sense of a word' and that 'intonation or pitch of voice is not a significant element of speech in Bengali'. These facts were observed by Professor S. K. Chatterjee in his *A Brief Sketch of Bengali Phonetics* published in 1921. But it is little known that in some Eastern Bengali dialects tone is a very significant element of speech. In this dialect presence of a rising tone does alter the sense of a word. Of course, it is well known that tone is quite a significant element of speech in some of the New Indo-Aryan languages; for instance, Panjabi. But its presence in some of the Eastern Bengali dialects could attract the attention of quite a few scholars. The tonal

element in Panjabi as well as in Eastern Bengali has been noticed in respect of various new ways of treating the voiced aspirates and 'h'. Professor Chatterjee once mentioned the introduction of a tonal element in Eastern Bengali (pp. 111 and 112, in *Indo-Aryan and Hindi*).

The element of tone, as I understand it, is a process of lengthening of the vowel by means of prolongation of breath which is musical in nature. After repeated examinations through recordings, etc., I have come to the conclusion that this element of tone, as it is found in this dialect, is generally of a rising nature. But there may be exceptions of which I am not so sure at the moment. The following pairs of words will show clearly that a word may mean one thing with the accompanying tone but may mean just another without it :

1. batti = lamp; baVtti = ripe.
2. patla = thin; patlaV = leaf and bamboo headgear of the peasants used in East Bengal.
3. Cara = sapling; CaraV = chips of earthen pots, etc.
4. bo'ri = tablet; bo'riV = fishing-hook.
5. Ho'ri = a name of God Vishṇu; Ho'Vri = mother-in-law.
6. ko'i = a kind of fish; ko'Vi = where, whither.
7. kOr = marks on the finger joints; kOVr = do (imperative).
8. agun = fire; aguVn = Bengali month of Agrahāyana.

There may be many more pairs of this nature. However, if we carefully examine some of the above-mentioned words then we may find out that the accompanying tone is somewhat compensatory in nature, for example, bo'riV = fishing-hook, comes from bOriSO or bOrSi. The alveo-palatal sibilant is lost and is being compensated by the rising tone. But, in other cases it is not at all easy to hazard a guess about the origin of this rising tone. It may only be noted here that the words with the accompanying tone are not always *tatbhavas* but may be of *desī* origin as well. As a matter of fact, the significance of this tone is very much felt by the actual users of the Eastern Bengali dialects. While discussing the dialectal variances we often say, 'HAgO kOtar Tan alada', meaning, 'The intonation of their speech is different'. That a tonal element may exist significantly in many words used in this dialect, independent of any secondary development, is also evident from the above study. I am also aware of the fact that it can be of compensatory in many cases and this I consider to be a secondary development in the dialect. Here, I agree with Professor Chatterjee that this tonal element is bound up with the new ways of treating the voiced aspirates and the 'h'. The following is the finding of Professor Chatterjee regarding the Eastern Bengali dialects in this respect : 'In East Bengali the "h" becomes a glottal stop, and the unvoiced aspirates when initial alone retain their proper aspirate character; the initial voiced aspirates are invariably turned to recursives with the aspiration changing to an accompanying glottal closure modifying the voiced stop sound forming the basis of the voiced aspirate and the interior unvoiced and voiced aspirates are both turned to recursives, and then the glottal stop element (or, rather, the glottal closure as the substitute for "h" in pronunciation) in these newly-formed interior recursives is transferred to the initial syllable, affecting the quality of the consonant in that initial syllable' (*Indo-Aryan and Hindi*, p. 112). Although Professor Chatterjee felt that tone had only been partially introduced in the Eastern Bengali dialects, the examples cited earlier showed that the tonal element in at least this dialect of Dacca is neither partial nor insignificant, on the other hand, it may even exist, independent of any secondary development.

14. TONE AND VOICED ASPIRATES

The modifications undergone by the voiced aspirates may very well be bound up with the tonal element and that the case is exactly so will be evident from the following pairs of words of identical nature, differing only in aspiration.

1. gao = village but gaVo- : ghaO- : ghatO = wound; gOr = wayside ditch but gOVr- : ghOr = room; gora = root but goVra- : ghora = horse.

2. zOr = fever but zOVr- : jhOR = storm, zal = net but zaVi- : jhal = hot; zama = shirt, etc., but zaVmā - : jhama = black brick; zir = earth worm but ziVr- : jhir = of the maid-servant.

3. Dak = do call but DaVk- : dhak = a kind of drum; DaHa = to call but DaVHa- : Dhaka = city of Dacca; Dol = container of paddy, etc., but DoVi- : Dhol = another kind of drum; Dim or Dima = egg but DiVmā- : Dhima = slow; Dutā = container of fish made from bamboo shavings but DuVla- : Dhula = bending from side to side.

4. dOr = price but dOVr- : dhOr = do catch; dan = donation but daVn- . dhan = paddy; doa = to milk but doVa- : dhoa = to wash; dul = a kind of ear-ring but duVla- : dhula = dust.

5. bat = rheumatism but baVt- : bhat = boiled rice; bala = bangle but baVla = good; bap = father but baVp- : bappO- : baspO = steam.

Each second word of the every pair cited before had a voiced aspirate initially but it had been lost and instead a rising tone on the immediate vowel compensated the loss. Now the case is such that without the accompanying rising tone on the immediate vowels these voiced aspirates are pure and simple voiced stops (in one case, a voiced fricative). This is so apparent that one has to be careful about this tone without which the meaning of a word may be totally altered. I have examined the behaviour of the initial voiced aspirates in combination with as many different vowels as possible and the result has been the same. As far as the present stage of development of the dialect is concerned I have no doubt that the phones which were once voiced aspirates are now anything but voiced stops, etc. The only reminder that these were once voiced aspirates is the accompanying tone. However compensatory this tone may be, at present, it does not modify the consonant but it does modify the vowel.

15. TONE AND UNVOICED ASPIRATES

Another relevant point of discussion is how the glottal fricative and the unvoiced aspirates are pronounced in this dialect. We have examined their actual occurrence earlier. So, here, we shall consider their disaspiration and examine whether this disaspiration is also compensated by any kind of tone or not. We shall now take up each one of these phones systematically, beginning with the glottal fricative.

1. *Glottal fricative*.—We have seen while examining the actual occurrence of this phone that in the present stage of development of this dialect it occurs both initially and non-initially. Historically speaking, all the present occurrences of this phone initially and some of the present occurrences non-initially are secondary developments. Did it occur initially in the previous stage of development? From such words as Oe- : HOe, ati- : Hati, atti- : HOsti, at- : Hat, etc., it seems highly likely. So, then, it is clear that after the loss of the phone in initial positions the accompanying vowel has survived and in such cases the loss is not compensated in any way. But then the compensatory rising tone in such cases is not rare. Some examples may be cited: ata = a kind of fruit but aVta- : Hata = sleeve, ladle; asA = is, stays but aVsA- : HaCE = sneezes; aDa = glue but aVDa- :

H_aTa = walking; arai = two and a half but aVrai- : Harai = I lose. The rising tone found in the second word of each pair seems to be a clear compensation of the lost initial glottal fricative.

2. *Velar unvoiced aspirated stop*.—It is quite clear from the examples cited earlier that this phone is intact initially and is rarely found intervocally as double consonant. But it does not occur finally at all. Has it been lost non-initially? From such a sentence as Co'uHE dO dEH_i na- cokhE to dEKhi na it is apparent that the phone is lost only partially, i.e. its basic stop is lost but the aspiration is retained. So, the question of compensation does not arise in this case.

3. *Alveo-palatal unvoiced aspirated affricate*.—It exists in this dialect (examples cited earlier) only in intervocalic position and that, too, as doubled consonant. Apart from that, this is a highly unstable phone in the dialect under investigation and in all probability, it is connected with the 's' phoneme which is a stable sound. Did it previously exist in initial and other positions independently? From such examples as SaVgOl- : chagOl, sad- : chad, kas Δ - : kachE, gas- : gach, etc., it is apparent that the dental fricatives in those cases are most possibly secondary developments from alveo-palatal unvoiced aspirated affricates. Here, the affricate has become a fricative and the aspiration has been lost. Is it compensated in any way? Yes, it is compensated by a rising tone. But it is not possible to demonstrate it by means of a pair of words of identical combination, differing only in meaning, as I did in other cases because such pairs of words are very rare. Still, we may form pairs of words, one of which may contain a dental fricative and a rising tone and the other may contain a dental affricate in the same position without any tone. The difference between these two phones is so negligible in actual speech that the rising tone following the fricative is a great help for catching the difference of meaning.

Besides, while describing the dental fricative earlier, I already observed that, in initial and intervocalic positions, it is followed by a rising tone. This becomes apparent only in contrast with a dental affricate in identical combinations such as baCa mas = a kind of fish but basaV mas = selected fish; Cao = you want but saVe = young ones of the animals; kaCAR = of glass but kasAVr = of near. Cir_a = hammered rice but siVra = torn, etc.

4. *Retroflex unvoiced aspirated stop*.—It occurs initially (examples cited earlier) and not in intervocalic and final positions. Such words as paDaV- : paTha, piDaV- : piTha indicate that this phone has lost its aspiration in non-initial positions and its unvoiced base has become a voiced stop. That the loss of aspiration is compensated by a rising tone will be apparent from the following pairs of words :

koDa = to cut in pieces but koDaV- : koTha = room; kaDa = thorn but kaDaV- : kaTha = a unit of measurement; oDa = front step but oDaV- : oTha = lift up (imperative), etc.

5. *Bi-labial unvoiced aspirated stop*.—It does not occur in this dialect at all. Its nearest sound, bi-labial unvoiced aspirated fricative 'F', occurs in all positions (examples cited earlier). The question of loss of aspiration and its compensation does not arise here.

6. *Dental unvoiced aspirated stop*.—It occurs only initially in this dialect (examples cited earlier). From such words as patOr- 'pathOr, khAta- , k \ddot{a} tha, HitAn- : Sithan, mata- : matha, rOt- : rOth, etc., it is clear that the aspiration of this phone has simply been lost in non-initial positions. This loss is not compensated in any way, possibly because confusing pairs of

words, arising out of this phone like that in earlier cases, do not occur in this dialect.

16. TONE AND ASPIRATES IN FINAL POSITION

Lastly, what happens when an aspirate occurs finally in a word? The answers will be apparent from the following words : unvoiced—dAk- : dAkh, mas- : mach, kaVT- : kaTh, rOt- : rOth, bOrOF; voiced—baVg- : bagh, laVb- : labh. It is apparent that kh : -k, ch : -s, Th : -T, th : -t and 'F' remains unchanged and gh : -g, bh : -b. But, it is also clear that 'Th' while becoming 'T' is preceded by a rising tone and so are 'g' and 'b', developed from 'gh' and 'bh'. We can examine this compensatory rising tone further with the help of pairs of identical combinations. This tone does not follow the stops but precedes them in such words as bag = rein, control but baVg = tiger, kaT = cut (imperative) but kaVT = wood. Thus, this rising tone on the preceding vowel is a different phenomenon than the rising tone on the following vowel shown earlier. But such pairs of identical combination are very rare. Still, it is clear that the rising tone on the preceding vowels is quite significant as it sometimes alters the meaning.

Key to the signs used :

— for 'means' / . : for 'coming from' / : for 'becoming' / ~ for nasal vowel.

POSTSCRIPT

Diphthongs and Triphthongs.—Instead of diphthongs and triphthongs, 'two-vowel-combinations' and 'three-vowel-combinations' are to be read wherever those two words occur in this discussion.

Description of the Vowel Sounds.—Reason for using the term bi-labial for u, o and a = O, instead of back vowels, is that the lips play a very dominant role in their articulation whereas ó, the allophone of the O-phoneme, a half-closed-back-vowel, does not depend so much on the lips.

Other Vowel-combinations and Diphthongs.—As diphthongs mean two vowels pronounced in the same breath, all the two-vowel-combinations are not diphthongs. The following diphthongs only occur in the dialect under consideration : (1) ui- as in duui; (2) Oo- as in bOo; (3) Oe- as in kOe; (4) oi- as in boi; (5) óu- as in buu; (6) oe- as in doe; (7) au- as in lau; (8) ao- as in khao; (9) ae- as in zae; (10) ai- as in tai; (11) Ei- as in HEIDA; (12) Eu- as in FEura; (13) Ae- as in dAe; (14) Ao- as in nAo. Thus, of the twenty-five two-vowel-combinations only fourteen are actually diphthongs. 'a-' can form four diphthongs but i- cannot form any, because a- is the most open and i- is the most closed of all the vowels. There are no triphthongs or tetraphthongs in this dialect. Moreover, if vowel combinations of more than two vowels occur, the diphthongs make separate syllables.

INDIAN BOTANY IN RETROSPECT WITH PARTICULAR REFERENCE TO ALGAL SYSTEMATICS

By K. S. SRINIVASAN

While the land-vegetation, particularly the Phanerogamic flora of India, is fairly well known through the labours and concerted efforts of a galaxy of botanists and explorers, Indian Algology on the other hand occupies relatively a much lower rung in the ladder of botanical progress in India. The reason therefor is not too difficult to find. As observed by Kurz in 1869 (see Martens, 1870), the minuteness of many forms, the care necessary in the preparation of the collected materials and especially the great difficulty which is experienced in the determination of freshwater algae in a dried state, have been the principal cause of their having been almost totally neglected by Indian botanists.

In the present paper an attempt is made to review the Indian Algology and the progress it has made through subsequent years, with a view to supplementing the information available on the subject through earlier publications. While thus reviewing, advantage is taken to make a comparative study of the Phanerogamic Botany of the early periods in India, to comprehend the knowledge in Indian Botany.

BOTANY OF THE ANCIENT INDIA¹

How far back does our knowledge of Indian Botany go? That indeed is a thought-provoking subject. A survey of our ancient Indian Sanskrit literature shows references to several plants and flowers in our *Vedic* and *Classical* literature. The *Vedic* literature comprises the four *Vedas* with their respective *Samhitas*, *Upanishads* and *Sutras* and is taken to cover a period from 1500 B.C. to 200 B.C. The *Classical* literature which began with the *Epics*, *Ithihasas*, *Puranas* and *Kavyas* covers all the subsequent periods.

In the *Vedas* references are made to *Kalpaeriksha* कल्पवक्षः or *Kalpadruma* कल्पद्रुमः (*Cocos nucifera* Linn., *Borassus flabellifer* Linn. according to some authors), *Salmali* शालमली and *Yamadruma* यमद्रुमः (*Bombax ceiba* Linn.), *Palasa* पलाश (*Butea monosperma* (Lamk.) Taub.) and several other trees and plants. The wood of *Palasa* is frequently mentioned as sacred and sacrificial.

Among the *Classical* literature, the *Vishnu Purana* is one of the eighteen *Puranas* wherein the stories of the ten *Avatars* of Vishnu are described. In this the legend is given on *Parijataka* पारिजातक (*Nyctanthes arbor-tristis* Linn.), a plant supposed to have been brought by Lord Krishna for his spouse *Satyabhama*. In the *Skanda Purana* reference is seen to *Arka* अर्क (*Calotropis gigantea* (Linn.) R. Br.) as being the transformation of *Surya* or Sun-God. Likewise we find references in Ancient Hindu Mythology to *Vata Vriksha* वटवृक्षः (*Ficus benghalensis* Linn.), and the Peepul tree (*Ficus religiosa* Linn.) as transformation of *Brahma*. It is also being referred to as the *Asvattha* अश्वत्थ, and is believed to be inhabited by the sacred triad, *Brahma*, *Vishnu* and *Siva*. The dried twigs of this tree are held very sacred for producing sacred fires.

In *Manusmriti*, *Āmra* आम्र or *Sahakara* सहकार (*Mangifera indica* Linn.) is referred to be the transformation of *Prajapati*, the Lord of Creatures. In the *Puranas*, *Kasa* काश (*Saccharum spontaneum* Linn.) is highly celebrated and *Indra*, the God of War, is referred to as having been born in a field of it. The institutions of *Manu* make allusions to *Ikshu* इक्षु (*Saccharum officinarum* Linn.) and the bow of *Kamadeva* or Cupid is sometimes represented as of sugar-cane. *Tulasi* तुलसी (*Ocimum sanctum* Linn.), the sacred basil, is alluded to as being the transformed nymph, *Tulasi*, beloved of *Lord Krishna*.

The medicinal and other attributes of several plants are also known from ancient times. In the *Vedas*, a plant is mentioned as *Soma* सोम, the juice of which is important in *Veda* and *Avesta* sacrifices. In later *Vedas*, the juice of the plant is mentioned used as astringent in the preparation of a kind of beer. In *Ayurveda*, which is known to contain between 600 and 700 plant names, reference to *Soma* is seen, and the plant is known to be imported from far North. In *Susruta*, *Nagavalli* नागवल्ली (*Piper betle* Linn.) is described as aromatic, carminative, stimulant and astringent. In the several positive sciences as *Susruta Samhita*, *Charaka Samhita* and *Danvautri's Vaidya Sastra* numerous references are to be seen to medicinal plants.

Among the *Epic*s of Classical literature, *Ramayana* is the oldest work of *Karyas* or poems and *Mahabharata* the oldest of the *Ithihasa* or stories or legends. *Ramayana* existed before *Mahabharata*. The original portions of *Ramayana* are now taken to have existed before 500 B.C. In these great *Epic*s several references to trees and flowers, indigenous to our ancient land, are seen.

In all lyrical poetry, a happy combination of dignity of diction and sublimity of thought is discernible. Plant and animal worlds play a very important part, they being treated with great charm and beauty. Of flowers, the lotus is most familiar, and the descriptions of great many trees, creepers and flowers are not only superb but also true and authentic, indicating the keen and powerful observations of Nature by our ancient writers.

PLANTS IN KALIDASA'S WORKS

Greatest among the Sanskrit poets was undoubtedly Kalidasa. His works are dated somewhere about the beginning of the fifth century A.D., though, according to Sir William Jones, the date is put as first century B.C. The two great lyric poems of Kalidasa are *Ritusamhara* and *Meghaduta*. They are also the greatest lyrics known in Sanskrit literature.

The *Ritusamhara* is a lyric of 144 stanzas under six sections, each for one of the six seasons prevalent in India. Herein the poet has described the seasonal flowers and landscapes accurately and vividly. In *Meghaduta* with 115 stanzas, the charm of various sceneries and forests is beautifully described. In *Sakuntalam*, which is one of the best examples of romantic drama of Kalidasa, several beautiful descriptions of flowers and indigenous plants of India are to be seen.

The beautiful colour of newly-blossomed flowers, simulating the lustre of pure red-lead,

विकचनवकुसुमभस्वच्छसिन्दूर भासा
प्रबलपवनवेगोद्भूतवेगेन तूष्णम् ॥

—*Ritu.*, Cant. I, v. 24,

the crackling noise of canes and bamboos in forests, when they are dry,

ज्वलति पवनवृद्धः पर्वतानां दर्सेषु
स्फुटति पटुनिनादैः शुष्कवंशस्थलीषु ॥

—Ritu., Cant. I, v. 25,

the various kinds of flowers blossoming in rainy seasons such as *Kadamba*, *Kutaja*, *Arjuna*, etc.,

मुक्त्वा कदम्बकुटजार्जुनसर्जनीपान्
सप्तच्छदानुपगता कुसुमोद्गमथीः ॥

—Ritu., Cant. III, v. 13,

the beautiful climbers with foliage bent by the weight of sweet-scented flowers,

श्यामा लताः कुसुमभारनतप्रवालाः
काङ्क्षेणि पुष्परुचिरा नवमालती च ॥

—Ritu., Cant. III, v. 18,

the breeze from woods fragrant owing to the contact of *Patala* flowers,

सुभग सलिलावगाहाः पाटलसंसर्गमुरभिवनवाताः

—Sakunt., Act I, 3.

the *Sami* tree containing fire inside (cf. *Mahabharata Anusasana Parva*, ch. 35),

निधानगर्भमिव मागराम्बरां
शमीमिवाभ्यन्तरलीनपादकान् ॥

—Raghuvamsam, III, 9.

and references to numerous trees and flowers such as *Chandan* चन्दन (*Santalum album* Linn.), *Asoka* अशोक (*Saraca indica* Linn.), *Kusumbha* कुसुम्भ (*Carthamus tinctorius* Linn.), *Ketaki* केतकी (*Pandanus tectorius* Soland ex Parkinson), *Chaitya* चैत्य (*Ficus religiosa* Linn.), *Mandara* मन्दार (*Erythrina variegata* Linn. var *orientalis* (Linn.) Merr.), *Madhavi* माधवी (*Hiptage benghalensis* (Linn.) Kurz.), *Vilea* विल्व (*Aegle marmelos* Corr.), *Kutaja* कुटज (*Holarhena antidysenterica* Wall.), *Nicula* निचूल (*Barringtonia acutangula* (Linn.) Gaertn.), *Yuthica* यूथिक (*Jasminum* sp.), *Kurubaka* कुरुबक (blue-flowered *Barleria* sp.), *Kesara* केशर (*Mimusops elengi* Linn.) and *Sirisha* शिरिष (*Albizia lebbeck* Benth.) are some of the examples of descriptions of plant life in their grandeur in our ancient literature. Among the most celebrated trees are the 'Trees of Paradise', of which five are recognized, they being *Harichandana*, *Kalpa*, *Parijataku*, *Mandara* and *Devadaru*.

Several plants are also represented in ancient sculptures. Thus for instance, in the Buddhist sculptures, *Panasa* पनस (*Artocarpus heterophyllus* Lam.) and *Bauhinia variegata* Linn. are commonly seen. *Kanala*, *Karnikara*, *Padma*, *Pushkara* and *Mrinala* *Pundarika* are the various names found in

ancient literature for *Nelumbo nucifera* Gaertn. and *Nymphaea* species which are also held sacred and met with often in sculptural representations.

DESCRIPTIVE BOTANY OF ANCIENT AUTHORS

Apart from the reference to numerous plants and flowers in our *Classical* literature, observations on seasonal activities of plants and trees, their sacred, domestic and economic uses, ecological and other aspects of botanical knowledge are also brilliantly depicted by our ancient authors. To mention only a few, the association of lotus *Kumuda* with the *Sarad* or sultry season, *Kunda* (*Jasminum multiflorum* (Burm. f.) Andr.) with *Sisira* or dewy season, *Lodhra* (*Symplocos racemosa* Roxb.) with *Hemanta* or winter season, *Kurubaka* (sometimes referred to *Gomphrena* sp. also) with *Vasanta* or spring season, *Sirisha* (*Albizia lebbeck* Benth.) with *Grishma* or hot season and *Nipa* (*Anthocephalus indicus* A. Rich.) with *Varsha* or rainy season is admirable.

In classification and terminology also, they have shown considerable skill and power of delineation. For example, while *Nalina* is commonly applied to water plants as lotus or lily, the two kinds are yet differentiated by appropriate terms as *Amboja*, *Kamala*, *Padma*, *Pundarika*, *Pushkara*, *Saroruha*, etc., to denote *Nelumbo nucifera* Gaertn., while *Utpala*, *Kumuda*, *Kavalaya* are used to indicate the water-lily, *Nymphaea* sp. Further, where sub-classifications are required, *Nilotpala* and *Vimalotpala* are used to describe the blue water-lily and *Sitotpala* and *Kumuda* are used to indicate the white water-lily. The various kinds of jasmines are distinguished by different names as *Kunda*, *Malati*, *Yuthica* and the different kinds of bamboos are likewise distinguished by different terms as *Kichaka* for hollow bamboos and *Vamsa* for tropical bamboos. *Vanira* is used to denote canes and rattans, among climbing palms. Among the conifers, the pine, *Sarala* (*Pinus roxburghii* Sargent), is distinguished from the cedar, *Devadaru* (*Cedrus deodara* (Roxb.) Loud). Even among the lesser attractive plants as grasses and sedges, there has been distinct terms used, as *Kusa* (*Desmostachya bipinnata* (Linn.) Stapf.) and *Durva* (*Cynodon dactylon* (Linn.) Pers.), to mark the more sacred and sacrificial grasses, *Musta* (*Cyperus rotundus* Linn.) the marsh sedge, and *Usira* (*Vetiveria zizanioides* (Linn.) Nash.) the fragrant grasses.

The economic aspects are also dealt by them. For example, among the dye plants *Kusumba* (*Carthamus tinctorius* Linn.), *Lodhra* (*Symplocos racemosa* Roxb.) and *Mendhi* (*Lawsonia alba* Lamk.) deserve mention. *Tila* (*Sesamum indicum* Linn.) and *Ingudi* (*Balanites aegyptiaca* (Linn.) Delile) represent oil-yielding plants. Among the cosmetics and fragrant flowers used in personal adornments, *Kethaki* (*Pandanus tectorius* Soland ex Parkinson), *Chandana* (*Santalum album* Linn.), *Kesari* (*Mimosa elengi* Linn.) and *Devadaru* (*Cedrus deodara* (Roxb.) Loud) are some. The use of sugar-cane *Ikshu* (*Saccharum officinarum* Linn.) and the various preparations of sugar-cane as sugar, molasses, etc., are also referred to in ancient literature. Some references to exotic plants are also to be seen here and there.

LOWER PLANTS NOT LOST SIGHT OF

While, no doubt, the great majority of the references to plant life in these ancient literature are to the higher groups of plants (Phanerogams), because of their conspicuous and attractive nature and their usefulness to man in many ways, the lower groups (Cryptogams) were not altogether passed unnoticed or unnoticed. We get references to *Uccilinmru*, a

mushroom, in *Meghaduta* of Kalidasa and to *Saivala* interpreted as scum or water-weed. These would clearly indicate that even in the very early days, these plant groups have received attention, even though comparatively in a far lesser degree than the higher plants.

In *Sakuntalam* of Kalidasa we find a beautiful verse in the following:

सरसिंबमनुविद्धं शैवलेनापि रम्यं
मलिनमपि हिमांशोलंकम् लक्षणीं तनोति ॥

—*Sakunt.*, Act I,

wherein the poet says that 'a lotus, even though covered with scum (algae), is charming: the spot, though dark, heightens the beauty of the moon'.

The foregoing account will thus spotlight the botanical knowledge obtained in the very early times in our ancient India and which knowledge appears to be largely based on the aesthetic, sacred and utilitarian aspects of plant life.

INDIAN BOTANY UNDER WESTERN INFLUENCE

Before the middle of the eighteenth century, the names of plants commonly were polynomials in Western countries. This was, however, superseded by the binomial system as was adopted by the great Linnacus in his *Species Plantarum* in 1753. Our modern concept of the rules of nomenclature has perhaps its beginning in Linnaeus' *Critica botanica*, 1737, which was written to explain the taxonomical and nomenclatural principles employed by him in his *Genera Plantarum* and *Hortus Cliffortianus* and later amplified in his *Philosophia botanica*, 1751. This established the real beginning of a sound nomenclature for plants.

A far wider appreciation of Indian Botany under the generally accepted scientific canons and International Codes came, perhaps, only with the advent of Western botanists in our country or under their influence. There are some excellent accounts of the history of Indian Botany by various authors, tracing the same from the early sixteenth century A.D. at least. The review on William Roxburgh's *Flora Indica* is prefaced by a good and concise account of the earlier history of Indian Botany, which may be considered as one of the pioneer efforts in this direction (Anonymous, 1832). The extent of information available at that time is indicated in the following observations therein: 'That materials have not been wanting . . . is evident if we call to mind the authors who have expressly written on Indian Botany and among these, it is lamentable to find that until the time of the author of the present work, none of our countrymen had distinguished themselves in the field.'

The *Flora Indica* of William Roxburgh contained in its fourth and the last part Cryptogamic plants especially of the higher groups. That comprised of 149 species, other than Musci, Lichens, Algae and Fungi, which bore a proportion of Cryptogamic plants to the flowering plants of the *Flora Indica* in the ratio of 1: 22 (Griffith, 1844). No alga was given at all in this great work of William Roxburgh. He, however, gave a few Charophytes in the earlier part.

As early as 1837, Robert Wight (1837), while reviewing Botany and its prospects, observed as follows: 'Botany has hitherto spread with tardy steps among us, the catalogue of Indian Botanists having never at any one time comprised of more than a few names: her most palmy days being undoubtedly embraced in the concluding years of the last and the first quarter of the present century: during which Koenig, Roxburgh, Rottler, Klein,

Heyne and Buchanan Hamilton flourished . . . and, the vegetable treasures of India have undoubtedly been highly honoured by the magnificence of the works dedicated to their illustration as those of Rheede, Roxburgh and Wallich . . .

Carrying the survey to the very beginning of the Christian era, very early references to the Indian plants are to be seen in the period covered between the third century A.D. and the first century A.D. in the works of Theophrastus, Dioscorides and Pliny. Theophrastus, otherwise also known as Tyrtamus (c. 372 B.C.-287 B.C.), a native of Eresus in Lesbos, was a pupil of Plato and a successor of Aristotle in the Peripatetic school. He was a voluminous writer and to him as many as 227 treatises are ascribed, covering very wide and extensive fields as Religion, Politics, Ethics, Education, Rhetoric, Mathematics, Astronomy, Logic, Meteorology and other Natural Sciences. Among his most important and large works are two botanical treatises, 'On the history of Plants' or 'Enquiry into Plants' and 'On the causes of Plants', which are regarded as most important contributions to botanical sciences during antiquity and the Middle Ages. In these works, there are references to Ivy on the mountains called Meros (Meru), to Jack-fruit trees used by sages in India as food, Banana, Mango, Jujubes, Cotton, Ebony, Date Palms, Legumes, Wheat, Rice, Barley, etc.

Dioscorides (c. A.D. 50) was a Greek medical man and his *Materia Medica* was most popular in the Middle Ages. Caius Plinius Secundus, more popularly known as Pliny (AD 23-79), was an indefatigable student and in his Natural History has dealt with, among others, Botany including Forestry and Agriculture in books XII-XIX and on Medical Botany in books XX-XXVII. In these works also, Indian plants are mentioned. Besides the above, references to Indian plants are also seen in the various works of Galen, Oribesius, Paulus, Aegineta, Mesue, Serapion, Rhezez, Avicenna and others (Anonymous, 1832).

However, not until the sixteenth century A.D. did Indian Botany receive greater attention by foreigners visiting India on various avocations. Among those the names of Garcia de Orta (sixteenth century), Hendrich van Rheede, Kaempfer, Petiver Jones, Charles du Bois (seventeenth century), Gerhard Koenig, Heyne, Klein, Thunberg, Sonnerat, Rumph, Burman, Rottler, Royle (eighteenth century), William Roxburgh, Nathaniel Wallich, Belanger, Robert Wight, Schmid, Bernard, Gardner, Mitten, Ferguson and others (nineteenth century), would merit special mention (see Burkill, 1955, 1956, 1961 and 1962 for an excellent account of Indian Botany and its history and Biswas, 1962).

T. Thomson (1857) observed that modern Indian Botany began with the Danish Missionaries of South India who were attracted to the Science, in the first instance by the benevolent wish to combine the practice of the healing art with the duties to which they had devoted themselves. A few combined to prosecute the sciences for its own sake, and some of the medical officers of the Madras Presidency formed with them a botanical association by which plants were examined and named and to which discoveries made by members at a distance were reported. One of the most distinguished associates was William Roxburgh, appointed as Superintendent of the Calcutta Botanic Gardens in 1749.

Fermor (1935) reviewed the development of Scientific Researches in India. In that he traced, among others, the circumstances which led to the formation of the Asiatic Society by Sir William Jones in 1784, the formation of the Royal Botanic Gardens in 1788 and the Agricultural Society of India in 1820, the establishment of the Indian Museum in 1886 and the Botanical Survey of India in 1889. Although Scientific Surveys in India commenced

first with the Trigonometrical Survey of India in 1800, and followed by the Geological and Zoological Surveys, according to Fermor, however, official provision for botanical work in India preceded that for any other sciences as from 1793, there has been botanical activities at Sibpur Botanic Gardens with William Roxburgh ranking foremost.

Speaking of Algae, Kurz in 1869 observed that 'the freshwater algae of Bengal and indeed of India generally are as yet very imperfectly known, though the number of species to be met with everywhere in out jheels, tanks, rivers, etc., appears to be a very large one. With regard to Indian sea-weeds, Prof. V. Marten's work, "Die Tange der Preussischen Expedition nach Ost-Asien", contains almost all that is known about them' (see Martens, 1870).

Burkill (1956) has rightly stated that during the period between the 30th and 40th of the nineteenth century '... of algae and fungi, there is little that need be said. Rottler had collected some of the large sea-weeds, Strachey and Winterbottom had collected Lichens, Royle did not let *Chara* pass unnoticed, Bisbame has occupied himself in a search with reference to Fungi'.

EXPLORATORY VOYAGES AND INDIAN ALGOLOGY

Apart from the individual efforts made by the earlier foreigners towards Indian Botany, various expeditions and exploratory voyages conducted from time to time to investigate the topography, physical and biological features of the different oceans have also contributed to an extent towards the knowledge of Indian Botany, particularly of the plants and animals of the coasts, continental shelves and oceanic beds.

Among the most important expeditions mention may be made of Galathea, Novara, Preussische Expedition, Challenger, Gazelle, Vega, Investigator, Valdivia, Siboga, Sea-Lark, John Murray Expedition, Yale North Indian Expedition, Swedish Deep-sea Expedition and others. Of all these, the greatest biological expedition sent out was that of H.M.S. Challenger, an English Expedition which lasted for four years from the 20th December, 1872, to 2nd June, 1876, and which extended round the world and brought out several new facts on oceanography and plants and animals.

The Galathea Expedition (1845-1847)

The Galathea, a Danish Expedition, visited Nicobars. Although a good account of the land vegetation is known through its report, the algal flora is not mentioned herein (Martius, 1851, Wallich's translation). However, the following is interesting to note that *Nitella furcata* (Roxb.) Ag. var *nicobarica* (A. Br.) Zaneveld is referred to for its locality and origin as ex Herb. Bot. Hofm. 1854: Galathea Expdn., 2732 (B), Nicobar Islands (Zaneveld, 1940).

The Novara Expedition (1857-1859)

The Novara, an Austrian Expedition, has added materially to our knowledge of the algal flora, particularly of the Diatom flora of the seas around and in Nicobars. This included also quite a number of new discoveries, with new species from Nancowry, Kamortha and Nicobar Islands. The following are some of the algae known from these regions through this expedition.

Chaetomorpha intestinalis (Ag.) Kutz., *Codium vermillaria* Dellile, *Enteromorpha intestinalis* (L.) Link, *Haiimeda tuna* (Ellis) Lamourx, *Rhizoclonium hookeri* Kutz., *Hydroclathrus cancellatus* Bory, *Sargassum aqui-*

folium (Turn.) Ag., *S. scherzerianum* Grun., *S. swartzii* (Turn.) Ag., *Turbinaria trialata* (J. Ag.) Kutz., var. *capensis* Kutz., *Acanthophora thierii* Lamourx, *Desmia hornemannii* Mertens, *Eucheuma spinosum* (L.) J. Ag., *Gelidium corneum* (Huds.) Lam. var. *subrigidum* Grun., *Gracilaria corticata* J. Ag., *G. lichenoides* (L.) J. Ag., *Halymenia jelinekii* Grun., *Asteromphalus nankoorensis* Grun., *Aulacodiscus orientalis* Grev., var. *nankoorensis* Grun., *Amphora kamorthensis* Grun., *Actinocyclus ehrenbergii* Pritsch., *Cerataulus turgidus* Ehrenb., *Cocconeis pellucida* Grun., var. *nankoorensis* Grun., *Coccinodiscus gigas* Ehrenb., *Denticula nicobarica* Grun., *Fragilaria nankoorensis* Grun., *Orthoneis barbadensis* Grun., var. *nankoorensis* Grun., *Navicula nicobarica* Grun., *N. kamorthensis* Grun., *Nitzechia jelineckiana* Grun., *Plagiogramma constrictus* Grev., var. *nankoorensis* Grun., and others.

The Preussische Expedition (1859–1865)

The Preussische Expedition, a German Expedition, added material information regarding algal flora of Indian Coasts. The report by Martens (1866) contains references to collections actually made much earlier by Wight from Hindustan, South India, by Belanger from Cape Comorin, Esper's collections from Malabar, and the specimens from various parts of India contained in the Herbaria of Agardh, Joseph Banks and others. Among these, several of Koenig's collections are also reported. From 25th July, 1860, to April 1862, this expedition covered Java, Singapur, Siam, Makao, Hongkong, Philippines, Maccassar, Great Sunda Islands, Molluccas, Timor, New Holland and by 27th July, 1863, it touched Ceylon, and then proceeded to Aden. The following are some of the algae from Indian region as seen from this report:

Caulerpa taxifolia (Vahl.) Ag., var. *crassifolia* Ag., *Chaetomorpha antennina* Bory, *Chaetomorpha indica* Kutz., *Cladophora roeillieri* Roth., *C. tranquebariensis* Roth., *Chuvinia chemnitzia* Turn., *C. sedoides* Ag., *Halimeda multicaulis* Lamourx, *Ulva fasciata* Delille, *Zygomonium ericerorum* Kutz., *Carpacanthus biserula* J. Ag., *Sirophysalis muricata* Turn., *Sargassum aculeata* Kutz., *S. angustifolium* C. Ag., *S. concinnum* Grev., *S. capillare* Kutz., *S. cristae folium* Ag., *S. esperi* J. Ag., *S. granuliferum* Ag., *S. grevillei* J. Ag., *S. spathulaefolium* J. Ag., *S. spinifex* Mertens, *S. teretifolium* J. Ag., *S. virgatum* Mertens, *S. wrightii* Grev., *Turbinaria triquetra* (?), *Chondrus spermophorus* L., *Compsopogon hookeri* Mont., *Centroceros hyalacanthum* Sonders, *Dictyurus purpureescens* Bory, *Dumontia robusta* var. *wightii* J. Ag., *Epineuron lineatum* Harvey, *E. fraxinofolium* Martens, *Gymnogongrus pygmaeus* Grev., *G. densus* Grev., *Hypnea nigrescens* Grev. *H. musciformis* Wulfen, *Halymenia dubia* Bory, *H. amoena* Bory, *Laurencia flagellifera* J. Ag., *Sphaerococcus corticatus* Kutz., *S. distichus* Ag., *Spyridia ericoides* Herring and several others.

The Challenger Expedition (1872–1876)

There is no record of algae from Indian region proper, as the Indian Ocean was not included in its programme, although this expedition was the greatest biological expedition sent out lasting for four years, and extending round the world.

The Investigator Expedition (1890–1892)

The Investigator, an English Expedition, investigated the Indian Continental shelves and slopes. That brought some knowledge of the algae

of the Cocos group of Islands and the Diamond Island in the Bay of Bengal. Among the Algae known through this report are the following:

Caulerpa clavifera J. Ag., *C. plumaris* J. Ag., *Halimeda opuntia* Lamourx, *Siphonocladus filiformis* De Toni, *Valonia confervoides* Harv., *V. fastigiata* Harv., *Vaucheria* sp., *Dictyota dichotoma* Lamourx, *Padina pavonia* Gaill., *Sargassum ilicifolium* J. Ag., *Turbinaria ornata* J. Ag., *Acanthophora thierii* Lamourx, *Gracilaria crassa* Harv., *Jania tenella* Kutz., *Lithothamnion polymorphum* Aresch., *Calothrix pulvinata* J. Ag., Nostocaceous algae and others.

The Valdivia Expedition (1898-1899)

The Valdivia, a German Scientific Expedition, included in its sojourn, Kerguelen, Cocos Coasts, Keeling, Sumatra, Nicobars, South Maldives, Chagos Archipelagos, Seychelles and Zanzibar. Our knowledge of the algal flora of the Great Nicobars, Katchal, Nancowry and southern parts of the Bay of Bengal is added by the collections brought by this Expedition. Among the various algae reported are the following:

Carpopeltis rigida (Harv.) Schm., *Bacteriastrum varians* Lauder, *Chaetoceras lorenzianum* Grun., *C. peruvianum* Brtw., *C. coarctum* Lauder, *Climacodium biconcavum* Cleve, *Rhizosolenia calcar-avis* Schulze, *R. alata* Brw., *R. temperii* H. P., *R. habeata* f. *semispina* Gran., *R. styliformis* Brtw., *R. intracellularis* Sehn., *Ceratium tripos macrocens* Ehrenb., *C. candelabrum* (Ehrenb.) Stein, *Katagnyema spiralis* Lemm., and several others. Some among the new species of Diatoms reported here are *Bellerochaea indica* G. Karsten, *Chaetoceros sumatrana*, G. Karsten *C. seychellarum* G. Karsten, *Lauderia punctata* G. Karsten, *Rhizosolenia simplex* G. Karsten var. *major* G. Karsten, *R. squamosa* G. Karsten, *Thallasiothrix heteromorpha* G. Karsten, etc.

The Siboga Expedition (1899-1900)

The Siboga Expedition, a Dutch Expedition, reported the following from Nicobars, Andamans, Great Nicobars, Maldives, Laccadives, Indian Coasts and Indian Ocean:

Bryopsis indica A. and E.S. Gepp, *Avrainvillea erecta* A. and E.S. Gepp, *Caulerpa racemosa* (Forsk.) Web. v. Bosse var. *chemnitzia* (Esper) Web. v. Bosse f. *turbinata* (J. AG.) Web. v. Bosse, *Halimeda cuneata* Herring, *H. incrassata* Gepp, *H. macroloba* Decsne, *H. opuntia* Lamourx, *Rhizoclonium hookeri* Kutz., *Udotea indica* A. and E.S. Gepp, *U. flabellum* Howe, *Valonia pachynema* (Harv.) v. Martens, *Sargassum aquifolium* (Turn.) Ag., *S. binderi* Sonder, *S. biserrula* J. Ag., *S. cinctum* J. Ag., *S. gracile* J. Ag., *S. microphyllum* C. Ag., *S. myriocystum* J. Ag., *S. swartzii* (Turn.) Ag., *Archaeolithothamnion erythraeum* (Rothpl.) Foslie, *A. schmidtii* Foslie, *Catenella opuntia* (Good et Wood.) Grev., *Corynomorpha prismatica* J. Ag., *Dictyurus purpurescens* Bory, *G. laccadivarum* Foslie, *G. reinboldii* A. Webb. v. Bosse et Foslie, *Halymenia amoena* Bory, *Lithothamnion fruticulosum* (Kutz.) Foslie, *L. fruticulosum* (Kutz.) Foslie f. *clavulata* Foslie, *Lithophyllum oncodes* Heydr., *Neurymenia fraxinifolia* (Mert.) J. Ag., *Hapalosiphon flagelliformis* (Schmidle) Forti, *Hydrocoleum violaceum* Martens, *Scytonema javanicum* (Kutz.) Born. et Thur. and several others.

The Sea Lark Expedition (1904-1905)

The Sea Lark Expedition covered *inter alia* Ceylon, Mauritius, Seychelles, Chagos Archipelagos and the adjoining islands in the Indian Ocean,

and Laccadives and Maldives. The algae reported from Maldives and Laccadives include the following:

Ectocarpus spongiosus Dickie, *Archaeolithothamnion erythraeum* (Roth.) Foslie, *Goniolithon frutescens* Foslie, *Lithophyllum craspidum* Foslie, *L. keisseri* Heydr. f. *typica* Foslie, *L. keisseri* Heydr. f. *subplicata* Foslie, *L. oncodes* Heydr., etc.

The John Murray Expedition (1933-1934)

The John Murray Expedition traversed the SE. Arabian coasts and Maldives among other places. From the SE. Arabian coast from Khorya Morya Isls., Cape Isolette and Carols Bank, and Jezirat Isls., the following are known:

Sphaeraria furcigera Kutz., *S. tribuloides* Menegh., *Amphiroa anceps* (Lamk.) Decsne, *Erythrotrichia investiens* (Zan.) Born., *Gelidium cartilaginum* (Linn.) Gaill., *Gracilaria corticata* J. Ag., *G. verrucosa* (Huds.) Papenf., *Hypnea musciformis* (Wulf.) Lamorx, *Lophosiphonia subadunca* (Kutz.) Falk., *Phormidium tenue* Gom., and from Maldives *Microdictyon pseudohapton* A. and E. S. Gepp f. *luciparens* Setch.

The Yale North India Expedition (1932)

Besides the oceanographic expeditions, some expeditions conducted on the main land of India and the Himalayas have also brought some knowledge of the algal flora of India. During the Yale North India Expedition, under the leadership of Dr. H. de Terra, limnological studies of a number of lakes in Ladak were made at altitudes between 4,267 m. and 5,274 m. G. E. Hutchinson made collections from Ladak (Western and Indian Tibet) and in the Panjab. Most of the specimens were from hot springs at high altitudes, particularly from the Kyam spring in the valley of the Chang-chanmo River, Ladak. The Cyanophyta were reported by Skuja (1932), Hutchinson (1936) and Drouet (1938).

HISTORY OF INDIAN ALGOLOGY

The reference to lower plants in Ancient Indian Sanskrit literature has already been alluded to in the preceding pages. It will, however, be most interesting to mention here of a reference in *Upanishads* to food being derived from water: अन्त अपः. This has a most striking similarity of concept and also of practice obtained more recently of the prospects and possibilities of large-scale culture of algae for food to keep food supply in balance with a steadily increasing world population in which much work is being done for several years in many countries, especially U.S.A., Germany, Japan, England, Netherlands, Israel, etc., utilizing such species as *Chlorella pyrenoidosa*, *Scenedesmus obliqua*, *Nitzschia palae*, etc.

Our knowledge of the Indian Algae after the European settlement in India is, however, to be traced to the latter part of the eighteenth century only. There has been some very good review on Indian Algology by the more recent botanists. Among them mention may be made of the accounts given by Agharkar (1923), Iyengar (1928, 1957), Biswas (1932, 1934, 1949), Joshi (1949), Ghose (1933), Dixit (1940) and Randhawa (1960).

Agharkar (1923) traced the algal history from Royle to Brühl and Biswas, covering a period from 1839 to 1922. According to Agharkar, at

the time of his review, 700 desmids, 38 Characeae and, among the marine algae, Caulerpas were only known till then.

Iyengar's (1928) account, however, covers a period from 1834 to 1927 from Robert Wight down to Handa, thus carrying the early history back by about five years at least. In the observations of Iyengar (1957), the algal researches in India reached a high level of activity during the period from 1939 to 1950. In his admirable review, Iyengar (1957) has covered systematics of Chlorophyta, Cyanophyta, Chrysophyta, Protomastigineae, Phaeophyta, Rhodophyta and general aspects of marine flora of Iranian Gulf, Karachi, West Coast of India, Malvan Harbour and freshwater algae of Assam, Chamba State, Burma, and fresh and brackish water flora of India and Burma. He also included in this review morphology, cytology, life-history, physiology, ecology and fossil-algae, thus making his account most comprehensive with an extensive literature.

Biswas (1949), however, traced the early history to 1798 with reference to Lebeck's collection of a *Chara* in 1798 in Ceylon, and traced down the history in India from Wight and Belanger to Biswas, covering a period from 1826 to 1933. Biswas' account would thus push back the earlier history by at least eight years to 1826 as far as India is concerned and by at least 36 years to 1798 when contiguous areas as Ceylon are also considered in the Indian Ocean region. According to Biswas, from 1920, all contributions are by Indian botanists mainly and regionally Bengal, South India and Burma were the centres of algal activities (Biswas, 1934).

Dixit (1940) traced the history of botany of Bombay Presidency in particular from A.D. 1838 to A.D. 1936 and has referred to Garcia d'Orta, John Graham, Stokes, Carter, Birdwood, Hansgirg, Hate, Boergesen and Apte among the important contributors to algal knowledge of the Bombay Presidency.

Zaneveld (1940) stated that according to Braun the first Charophyta of India is *Chara zeylanica* collected in Ceylon in 1798 by Lebeck, an official of the East India Company. During his examination, however, Zaneveld found that *Chara corallina* was collected in 1799 at Tranquebar at Coromandel without mention of collector's name. This collection is in Berlin Herbarium, and this was collected with *Chara setosa* (*Chara brachypus*) and *C. zeylanica* as shown in the first paper of Indian Charophytes by Willdenow in 1806.

Randhawa (1960) briefly dealt with the history under two periods : (1) the period of the pioneers from 1806 to 1907, and (2) later period from 1919 to 1960. He also referred to the earliest collection to Lebeck's variety of *Chara* in 1798, from Ceylon, and as to the Indian Algology, he reiterated the works enumerated by earlier reviewers and made passing references to Koenig, Roxburgh, Reynaud, Wight and Belanger among the very early contributors to Indian Algology. He has also casually referred to marine algae of India as being reported in the works of Agardh, Kjellman, Gepp and others.

Maheshwari and Kapil (1963) dealt in brief with the algal work in the twentieth century.

From the foregoing accounts, the earliest reference to algae relating to India and Ceylon taken together is to the date 1798 with reference to Lebeck's collection of a *Chara* in Ceylon. My own studies, however, revealed that the history is to be traced still far back to a much earlier period when there had been activities in the collection and study of Indian Algae from the Coromandel coasts. A short historical account from this very early date to the present is, therefore, given in the following pages to comprehend the history of algal studies in India during this period of about two centuries.

**KOENIG AND THE BEGINNING OF ALGAL WORK IN 1768 IN
SOUTH INDIA**

Our earliest knowledge on Indian Algae is derived from small but very interesting collections made by some of the early missionaries who settled in South India at Tranquebar, among whom the name of John Gerard Koenig would stand foremost.

John Gerard Koenig, a native of Courland on the Baltic, was born in about the year 1728. He studied Pharmacy, Medicine and Biology and for a period of two years was a pupil of the great Linnaeus. He proved an ardent and enthusiastic botanist. In 1768, he arrived in India in the employment of the Danish Missionary as Surgeon and Naturalist at Tranquebar. Later on he took over services under the Nawab of Arcot in 1774. In 1778 he was appointed as Naturalist in the Madras Establishment of the Hon'ble East India Company in which capacity he remained till his death on 26th June, 1785.

Koenig's name will always be remembered as the founder of the once famous 'United Brotherhood', enlisting among its associates such eminent men as Heyne, Klein, Rottler, Roxburgh with the noble purpose of examining and naming plants and to receive reports on the discoveries made by others from various distant places (Wight and Walker-Arnott, 1834; T. Thomson, 1857; C. E. C. Fischer, 1932; Rendle, 1933; van Steenis, 1948-54; Burkhill, 1955).

Modern Indian Botany owes a great debt to Koenig and his associates in the Tranquebar Danish Mission in South India. Koenig travelled much. After visiting various parts of India and Ceylon, he set out on an expedition to Siam and Malacca in 1778, sailing by boat from Madras on 8th August, 1778, via Nicobars. He returned to India on 4th April, 1779, past Nicobars. He made several collections and sent some of his collections to Schreber. With Koenig's collections, the other collections made by the Tranquebar Missionaries constitute the most important of Schreberian Herbarium, deposited in the Royal Herbarium at Munich which was founded in 1813 (Martius, 1851). Among these are the collections of Rottler and others. Retzius received also a large number of specimens from Koenig which are mentioned in his 'Observationes Botanicae' (1779-1791). Koenig also sent several specimens to Sir Joseph Banks, Linnaeus and to various European botanists from time to time. His collections were also distributed by Wallich with the Herbarium of the East India Company.

As an enthusiastic collector, Koenig collected, besides numerous angiosperms, some algal specimens also, mostly from Tranquebar and a few from Ceylon and other areas in the neighbourhood of India. Turner (1808) referred to Koenig's algae from Ceylon such as *Fucus pinnatus* and *Fucus taxifolius*. Koenig not only collected algae from South India and Ceylon, but also appears to have examined and described some of them, the manuscripts of which have been the basis for later botanists to publish those species. This is evidenced in the case of such species as *Fucus abietinus* Koenig, *Sargassum intricatii* Koenig, etc.

C. A. Agardh (1823) mentioned of *Sargassum ilicifolium* var. *marginatum* from Indian Ocean as having been communicated by Retzius—'forsan a Koenigio missum' and he also refers to an alga under *Fucus gelatinosus* Koenig (Mscr.). Again, Agardh (1824) has referred to a few algae originating from Tranquebar. J. G. Agardh (1848) has mentioned of the algae collected by Koenig, among which are *Sargassum granuliferum*, *S. microphyllum*, *S. cristaefolium*, etc. Kutzing (1849) referred to *Fucus intricatus* Koenig. Although Retzius' 'Observationes Botanicae' deals with numerous

phanerogams of Koenig's collections, there is no mention of his algal collections except for one species referred to therein as *Fucus zeylanicus* (probably a *Sargassum* sp.) from Ceylon (Retzius, 1891, fasc. 6: 40). The report on the Preussische Expedition (Martens, 1866), however, contains several species of algae collected by Koenig from Tranquebar among which are *Cladophora tranquebariensis* Roth., *C. rottneri* Roth., *Chaetomorpha indica* Kutz., *Sargassum virgatum* Mertens, *Sargassum angustifolium* C. Ag., *Carpacanthus microphyllus* Ag., *Sphaerococcus confervoides* L., *S. lichenoides* L., *S. spinosus* L., etc. Grunow (1915, 1916) has referred to the following collections of Koenig from Tranquebar and Ceylon, viz. *Sargassum intricati* Koenig, *Fucus punctatus* Klein, *Sargassum tenue* J. Ag., var. *koenigii* Grunow, *S. cristae folium* C. Ag., *S. biserula* J. Ag., *S. microphyllum* C. Ag., etc.

From the foregoing collections from Tranquebar and from the fact that from 1768 to 1774 Koenig was at Tranquebar, as the Missionary Physician, it would be borne out that there had been activities in algal collections in South India at Tranquebar and its neighbourhood from 1768 onwards, which would take the history of Indian Algology far back, at least by 25 to 30 years from 1798, the date mentioned in the earlier reviews of history of algal work in India by Biswas (1949) and Zaneveld (1940).

CONTEMPORARY MISSIONARY ACTIVITIES IN TRANQUEBAR

As mentioned earlier, scientific botany in South India commenced with the arrival of Koenig at Tranquebar. Previous to Koenig, collections of plants made in India were sent to Europe and to many of them, the descriptions were given by Linnaeus and others. With the arrival of Koenig in South India and the formation of the 'United Brotherhood', the position greatly changed. The plants collected by the members of this association were examined and named by the society in common. To distinguish such named collections, the word '*nobis*' was usually added. However, later on even this practice discontinued. Individual members of the society by themselves and independently began describing and naming the plants under their own individual authorities. But there still continued to be interchange of specimens among themselves (Wight and Walker-Arnott, 1834). Some of Koenig's own collections were preserved with his manuscripts in Banksian collections in the British Herbarium.

The vigorous botanical pursuits initiated by Koenig at Tranquebar chronicles important advance in Indian Botany, especially in the field of algology. Among the few other names through whose individual efforts algology had made progress in the very early years, those of Heyne, Klein and Rottler will always be associated with the Tranquebar Missionaries.

Heyne came to India by about 1777 as one of the Moravian Missionaries and Surgeon Botanist at Tranquebar. Like Koenig, he also changed his services to the Hon'ble East India Company later on. He also became a pupil of Koenig (Burkill, 1955). He was in charge of the spice gardens in Madras in 1818 and then he left for Europe.

John Peter Rottler was born in Strassburg in June 1748. He joined the Tranquebar Missionary in 1776 while Koenig was still active. He was the last of the Tranquebar group. He became also a pupil of Koenig. During the latter half of his services, Rottler was in Madras and in 1812-1813, Nathaniel Wallich had met him in Madras. Rottler showed great interest in the collection and study of Indian plants. Nathaniel Wallich has recorded his high appreciation of Rottler in the following words: 'I had the happiness of knowing personally both these most worthy missionaries and excellent botanists and of corresponding with them. With Dr.

Charles John, I became acquainted on my visit to Tranquebar in 1807, he died long afterwards. Dr. John Rottler I saw in 1812-1813 at Madras on my voyage to and from Mauritius. Like the late Dr. William Carey, he was heart and soul devoted to the missionary cause, he was a great orientalist and ardently attached to the study of plants. The venerable died in his 87th year on the 27th January, 1836. His important herbarium has been presented finally to King's College, London. In the Church of Vepery, Madras, there is an affecting tablet erected to his memory and several Rottler scholarships have likewise been founded at the seminary attached to it. Nathaniel Wallich' (Martius, 1851).

Among the various algae collected by Rottler and named also by him, the following few examples may be given: *Fucus nudus* Rottler (*Sargassum flavicrens* (Mert.) C. Ag. var. *nudum* (Rottler) Grun., in Herb. Berol), *Sargassum virgatum* (Mert.) J. Ag., *Chara filamentosa*, *C. foliolosa*, *C. polyphylla* (Royle, 1839), *Pithophora rottleri* (Roth.) Witt., etc.

John Godfried Klein was another missionary at Tranquebar. He collected several algae, principally from Tranquebar by about 1799 and some from Ceylon also. Among the algae collected and or named by Klein are *Chara corallina* Klein (*Chara corallina* Willd.), *C. setosa* Klein (*C. brachypus* A. Br.), *C. zeylanica* Klein (*C. polyphylla* A. Br. var. *ceylanica* A. Br.) in Herb. Willdenow, *Fucus trichophyllus* Klein, *F. filiformis* Klein (*Sargassum angustifolium* Kutz.), *F. punctatus* Klein, *Sargassum virgatum* (Mert.) J. Ag., *S. polycystum* C. Ag. var. *genuina* J. Ag. and others.

OTHER EARLY BOTANISTS

Besides the Moravian Missionaries at Tranquebar, quite a few enthusiastic botanists have also added to our knowledge of Indian Algology. Among them William Roxburgh stands out in bold and singular contrast to the host of botanists of the century. He was one of the most active and enthusiastic members of the 'United Brotherhood' and because of his outstanding contributions, he has won for himself the coveted honour of being styled as the 'Father of Indian Botany'. Roxburgh was at the East India Company's Establishment in Madras in 1776. With Koenig's notes, he wrote the plants of the Coromandel coast. He succeeded Robert Kyd in 1793 as the Superintendent of the Calcutta Gardens. Among the algae named by him are *Chara verticillata* Roxb. (*C. zeylanica* Willd.), *C. furcata* Roxb. (*Nitella furcata* (Roxb.) Ag.), and *Chara involucrata* Roxb. (*C. braunii* Gmelin).

Campbell was in India during the early years of Koenig and was a Surgeon in Madras by about 1768. He was also interested in plants and made some collections of algae. *Sargassum campbellianum* Grev. (*S. tenerimum* J. Ag. var. *campbellianum* (Grev.) Grun.) is a species named in honour of Campbell.

Carolus Petrus Thunberg was a Physician botanist and pupil of Linnaeus. He made an exploration tour to East Indies and Japan. He came to Ceylon by the 5th July, 1777, and stayed on the island till February 1778 on his return from Japan. He became later a successor to Linnaeus as Professor in Uppsala in 1784. He collected algae from Ceylon and from the Coromandel coasts and among his collections are *Sargassum spinifex* Mertens, *S. cinereum* J. Ag., var. *thunbergii* Grun., etc. Thunberg also sent plants to Linnaeus from Indian region.

Robert Wight came to India in 1819 as Surgeon in the employ of the Madras Settlement and from 1826 to 1828 was Superintendent of the Botanic Gardens at Madras. He collected vigorously and for some time he was

also on Military duty. He left India in 1855. He collected algae mostly from the Coromandel coasts in South India and among the numerous algae collected by him, mention may be made of the following: *Chara furcata* Roxb., *C. corallina* Willd., *C. flaccida* var. *wightii* A. Br., *C. brachypus* A. Br. var. *gracilescens* A. Br., *C. polyphylla* var. *ceylonica* f. *gymnoteles* A. Br., *Laurencia flagellifera* J. Ag., *Gymnogongrus pygmaeus* Grev., *Hypnea flagelliformis* Grev., *Stoechospermum maculatum*, *Sargassum wightii* Grev., *S. grevillei* J. Ag., and several others. Quite a number of Robert Wight's collections of algae are also in Hooker's Herbarium.

Charles Paulus Belanger arrived in India by the end of 1825. He sailed for India, commissioned by the French Colonial Department, to establish a Botanic Gardens at Pondicherry. He reached Pondicherry in 1826. He made several collections from Pondicherry, coast of Malabar, South Indian coasts, Cape Comorin and Elephanta near Bombay and other areas. Among the algae collected by Belanger are *Chara bellangeri* A. Br. (*Nitella acuminata* var. *bellangeri* A. Br.), *Nitella byssoides* A. Br., *Chara coronata* var. *coromandelina*, *C. hydropitys* var. *indica* A. Br., *C. polyphylla* var. *ceylonica* A. Br., *Halymenia amoena* Bory, *Ginannia furcellata* Mont., *Centroceros hyalocanthum* Sonder, *Dictyurus purpurescens* Bory, *Epineuron fraxinifolium* Martens, *Sirophysalis muricata* Turn. and others.

The foregoing account will generally indicate the algal pursuits in India during the eighteenth century.

THE NINETEENTH AND TWENTIETH CENTURIES PROGRESS; ALGAL GROUPS AND REGIONS COVERED

During this period, there has been increasing activities in algal studies. The number of contributors, working on varied aspects and from different parts of India has also been comparatively in increase. A review of the numerous works, covering different aspects of algal studies, would no doubt be a lengthy one and arduous. For brevity's sake, therefore, a general survey of the progress made in algology with particular reference to the systematics is alone attempted here. In this no claim is made for exhaustive enumeration. The areas from where reports of algae have been made from time to time, and the persons who either made collections or who reported upon the algal groups of particular regions, are given in the following pages. The various groups are treated separately and, under each, the areas from where reports have been made are indicated. The numerals within the parenthesis indicate either the year of the report or the year of collection as the case may be.

Among the various groups, Cyanophyta have been studied from a number of places in India. The group is also monographed by Desikachary (1959). Likewise, the Chlorophyta is also studied from a number of places in India and very valuable contributions on Desmids, Zygnemaceae, Oedogoniaceae, Volvocales, etc., have been made. Monographic works on Vaucheriacae (Venkataraman, 1961) and Zygnemaceae (Randhawa, 1959) are also published. The Charophyta has also been monographed (Pal et al. 1962). Valuable contributions on Bacillariophyta from Bengal, Bombay, North India, Nicobars, and from several other places in India have been made. Phaeophyta and Rhodophyta of the Arabian Sea coasts and the Bay of Bengal and Indian Ocean sea coasts of India are most valuable.

Fossil Algae

Interesting and valuable records of fossil algae of various groups have been recorded from different horizons in different localities in India. By

TABLE I

Localities	Cyanophyta	Chlorophyta	Charophyta	Phaeophyta	Bacillariophyta	Rhodophyta
North India						
Himalayas	Royle (1839).	Dickie (1882).			Skvortzow (1935). Carter (1926). Dickie (1882). Ehrenberg (1854).	
Kashmir and Srinagar	Bharadwaja (1933).	Misra (1937).	Groves (1923).			
Almora	Venkataraman, G. S. (1958).	Randhawa (1940).				
HIMACHAL PRADESH						
Simla	Ghose (1923).					
Chamba	Singh, V. P. (1941).					
PUNJAB						
Hoshiarpur	Vasishta (1960-62).	Randhawa (1934, 36, 37, 58, etc.).				
Uttar Pradesh Saharanpur	Reo, C. B. (1936, 37, 51).				Allen (1923, 24, 25, 27, 28). Groves and Allen (1927).	
Kumam	Singh, K. P. (1959).					
Lucknow	Thalpasyi (1962).					
Agra						
Fyzabad						
Allahabad	Zeller (1875).					
Mirzapur	Singh, K. P. (1959).					
						Singh, K. P. (1963).

Banaras	<i>Bharadvaja</i> (1934, * 35).	Rao, C. B. (1937). Allen (1926, 1961).
Gorakhpur	<i>Singh, R. N.</i> (1939).	Singh, R. N. (1938). Singh, K. P. (1941). Venkataraman, G. S. (1957). Singh, R. N. (1938).
DELHI	<i>Rao, C. S.</i> (1940).	Rao (1938).
MADHYA PRADESH <i>Jalalpur</i>	<i>Rao, C. S.</i> (1939).	O'Kuntze (1898).
SIKKIM	<i>Martens</i> (1870, 71). <i>Zeller</i> (1875).	Wallich (1860). Martens (1870, etc.). <i>Zeller</i> (1878).
BIHAR	<i>Prain</i> (1905).	Wittrock (1874).
BENGAL	<i>Brühl and Biswas</i> (1922, 23). <i>Biswas</i> (1925, 27, etc.). <i>Banerji</i> (1935, 36, 38), <i>Fritsch</i> (1949).	Turner (1885, 1892). <i>Lagerheim</i> (1888, 92). <i>Borge</i> (1899). Hirn (1900). <i>Kunz</i> (1869). West and West (1907). <i>Prain</i> (1905). <i>Bruhl and Biswas</i> (1923). <i>Biswas</i> (1929). <i>Philipose</i> (1958).

TABLE I—*Contd.*

Localities	Cyanophyta	Chlorophyta	Charophyta	Bacillariophyta	Phaeophyta	Rhodophyta
ASSAM <i>Manipur</i>	<i>Biswas (1930).</i> <i>Parukutty (1939).</i> <i>Bhardwaja (1963).</i>	<i>Biswas (1930, 35).</i> <i>Parukutty (1939).</i> <i>Bhardwaja (1963).</i>	<i>Kundu (1934, 37).</i>			
ORISSA	<i>Rao, C. B. (1938).</i>	<i>Philipose (1958).</i>				
GUJARAT						
<i>Kathiawar</i>		<i>George Watt (1894).</i>	<i>Agharkar (1921).</i>			
<i>Ahmedabad</i>		<i>Goyal (1964).</i>	<i>Kundu (1959).</i> <i>Goyal (1962).</i> <i>Blatter and Halberg (1918–20).</i> <i>Ghose (1934).</i> <i>Godbole (1951).</i>	<i>Gandhi (1959, 60, 61).</i> <i>Gandhi (1935).</i>		
RAJASTHAN				<i>Woodrow (1893).</i>	<i>Boergesen (1930, 32, 33).</i>	
<i>Jodhpur</i>				<i>Hobson (1863).</i>	<i>Burkill (1902).</i>	
MAHARASHTRA						
<i>Bombay</i>	<i>Beek and Zahlbruckner (1897).</i>		<i>O'Kuntze (1898).</i> <i>Hansgirg (1899).</i> <i>Schmidle (1900).</i>	<i>Gonzalves and Gandhi (1952, 53, 54).</i> <i>Gandhi (1960).</i>	<i>Boergesen (1931, 32, 33, 34, 35).</i>	<i>Schmidle (1900).</i>
<i>Simbar Lake</i>						

<i>Dharwar</i>	Gandhi (1956, 57).	Martens (1866). Web. v. Bosse (1921, 1928). Boergesseen (1937, 38). Ferguson (1876).
<i>Kolhapur</i>	Klein (1768). Wight (1826-28).	
S. INDIA	Belanger (1826). Royle (1839). Iyengar (1959). Allen (1938). Sundaralingam (1959).	
<i>Deccan</i>	Ghousuddin (1936). Iyengar, M.O.P., and Desikachary (1946).	Gandhi (1957, 58, 59).
<i>Hyderabad</i>	Philipose (1958). Iyengar (1958).	Klein (1768). Iyengar (1958).
<i>Anantara</i>	Gonzalves (1960). Iyengar, M.O.P., and Desikachary (1944). Rao, C. B. (1938).	Martens (1866). Ferguson (1875). Iyengar (1920, 23, 32, 33, 36, 59). Wight (1826-28). Belanger (1825). Sundaralingam (1959).
<i>Mysore</i>		Iyengar and Vimala Bai (1941). Iyengar and Ramarathnam (1942). Ramarathnam (1942). Gepp. (1911). Web. v. Bosse (1913). Boergesseen (1933).
<i>Madras</i>		Greville (1848, 49). Wight (1826-28). Martens (1866). Boergesseen (1933, 37, 38).

TABLE I.—*Contd.*

Localities	Cyanophyta	Chlorophyta	Charophyta	Bacillariophyta	Phaeophyta	Rhodophyta
<i>W. Coast</i>				Subrahmanyam (1958, 69). Misra (1956).		
<i>Kerala</i>	Parkatty (1940).			Grunow (1870). King (1892). Prain (1899).	King (1892). Prain (1899).	
<i>Cape Comorin</i>	Venkatasarman, G. S. (1957).			Kurz (1869). Heinig (1896).	Kurz (1869, 75). Reinbold (1907).	
<i>Narcondam and Burton Isles</i>		Prain (1893).	King (1892). Prain (1899). Heinig (1896).	Grunow (1870). Barton (1901).	Grunow (1870). King (1892). Prain (1899). Kurz (1868, 75). Heinig (1896).	Grunow (1870). Reinbold (1907).
<i>Andamans</i>				Rattray (1889). Ehrenberg (1854). Grunow (1870). Desikachary and Maheshwari (1958). Karston (1907).	Rattray (1889). Ehrenberg (1854). Grunow (1870). Desikachary and Maheshwari (1958). Karston (1907).	
<i>Nicobars</i>				Rattray (1889). Ehrenberg (1854). Grunow (1870). Desikachary and Maheshwari (1958). Karston (1907).	Rattray (1889). Ehrenberg (1854). Grunow (1870). Desikachary and Maheshwari (1958). Karston (1907).	
<i>Nancovry</i>						
<i>Coldbrook Isles</i>						

<i>Cocos Isles and Diamond Isles</i>	Prain (1891).	Prain (1890, 91). Gardiner and Gepp. (1908). Prain (1890, 1891).	Prain (1891).
<i>Laccadives</i>			
<i>Other parts of India</i>			
<i>Schmidle, Hassall, Turner, West, Martens, Frenny, Bhardwaja, Biswas, etc.</i>	Zeller, Sutherland, Carter, West, etc. A. Braun (1849). Willdenow (1806). Groves, J., and H. (1927). Groves (1923, 24). Wood and Imahori (1959). Zaneveld (1940). Pal, Kundu <i>et al.</i> (1962).		Foslie (1904). Gardiner (1907-08).
<i>Maldives</i>			
<i>NEPAL</i>			
<i>PAKISTAN</i>			
<i>Lahore</i>	Ghose (1919).	Murray (1880, 81). Anand (1940).	Murray (1881). Boergeszen (1930, 32, 33, 34).
<i>Karachi</i>			

far the largest representative of fossil forms are seen in Corallinaceae, Solenoporaceae, Dasycladaceae and Charophyta. Besides these groups, fossils belonging to Bacillariaceae, Chlorophyta and Euglenophyceae, Cyanophyta, Silicoflagellates and Xanthophyceae are also recorded from the Indian region.

Among the different geological formations and fossiliferous beds which have revealed fossil algal records in India are the following: the Cretaceous beds of Trichinopoly, comprising of the Niniyur, Cullygoody, Uttatur and Ariyalur and Mattur groups, the Cretaceous beds of Pondicherry in South India, the Pre-Cambrian beds of Cuddapah, Rayalecheru Limestones in Anantapur, the Palaeocene Inter-trappeans of Rajahmundry and Kateru beds, the Pangudi-Dudkur region in Rajahmundry, the Sausar and Vicarabad Inter-trappeans of the Deccan Traps, the Jurassic beds of the Gondwana Rocks of Rajmahal hills in Bihar, the Eocene, Palana beds of Bikaner, the Pre-Cambrian Vindhyanas of Lodwara hills of Bundelkhand, the Tertiary beds of Mohjoan-Kalan in Madhya Pradesh, the Ranikot series, comprising of the Lockhart Limestones of the Samana Range, the Palaeocene beds, the Punjab Salt Range, Khairabad Limestones, Dungham Limestones of Mehrab Tangi, Sind and Tibet beds, the Punjab Salt Range, comprising of the Lower Eocene Laki beds of Nammal Gorge and the Eocene of Salt Range, the Himachal Pradesh represented by the Eocene beds of Subathu, from Kashmir the Karewa beds of Handwara and other areas, the Tertiary rocks of Assam, the Pali beds of South Rewah, the Coole-brooke and Nan-cowry beds of the Andamans and Nicobars. From the contiguous regions, the Janjal series of Waziristan (Jurassic) and the Duktharen beds (Jurassic) of Afghan-Turkistan have also been studied for fossil algae and some records are made.

The following represent some of the interesting and important fossil algae forms from the above regions :

Cyanophyta

Scytonema sp., Karewa beds, Kashmir; *Synechocystis*, Palena lignites; *Aphanocapsa*, Pali beds, S-Rewah, and some micro-fossils in Upper Vindhyanas, with complicated structures as dendroid types, disc-like forms, having great affinity with Cyanophyta and representing primitive forms.

Chlorophyta

Spirogyrites, Chindwara, Madhya Pradesh and Deccan Inter-trappeans, *Oedogonites palanensis* Rao, in Palena (Eocene) Bikaner, *Ulothrix*, Inter-trappean cherts, Deccan Sausar, Vicarabad, *Pediastrum bifidites* Wilson and Hoffm., Subathu formation, Himachal Pradesh and among the Dasycladaceae, *Holosporella* sp. cf. *H. siamensis* Pia, Deccan Trap, Rajahmundry, *Holosporella* sp., Niniyur, Trichinopoly Cretaceous, *Triploporella ranikotensis* Walton, Sind, Tertiary Ranikot series, *Orioporella malaviae* Rao and Pia, Niniyur, Trichinopoly Cretaceous, *Piania niniyurensis* Gowda, Niniyur beds, *Morelletpora nammalensis* Varma, Ranikot beds, Punjab Salt Range, Palaeocene, *Dissocladella savitriae* Rao and Pia, Niniyur, Trichinopoly Cretaceous, *Indopolia satyavanti* Rao and Pia, Niniyur, Trichinopoly Cretaceous, *Clypeina sahni* Varma, Mattur, Cretaceous, Trichinopoly, *Clypeina* sp. Rao and Gowda, Niniyur, Trichinopoly Cretaceous, *Neomeris (Decaisnella)* sp. Varma, Niniyur, Trichinopoly Cretaceous, *Neomeris (Vaginopora)* sp. Varma, Niniyur, Trichinopoly Cretaceous, *Neomeris (Larbaria)* sp. Rao, Ranikot series, Lockhart Limestones, Samana Range,

Neomerearum sp. Rao, and Pia, Niniyur, Trichinopoly Cretaceous, *Aciularia dyumatesenae* Rao and Pia, Niniyur, Trichinopoly Cretaceous, *Aciularia indica* Varma, Niniyur, Trichinopoly Cretaceous, and some indeterminate Dasycladaceae from Anantapur and Vindhya.

Charophyta

From the Kateru Inter-trappeans, Rajahmundry, the various Charophyte fossils known are *Chara caelata* Reid and Groves, *C. helictres* Brong., *C. medicaginula* (Lamarck) Brong., *C. rajahmundrica* Rao and Rao, *C. sahnii* Rao and Rao, *C. sampathii* Rao and Rao, *C. subglobosa* Groves, *C. strobilocarpa* Reid and Groves, *C. vasiformis* Reid and Groves, *C. turbinata* Reid and Groves, *C. wrightii* Salter and among the *Chara* species from other regions, the following may be mentioned, viz. *C. malcolmsonii* Sowerby (Nagpur, Sical Hills), *C. sausari* Sahni and Rao (Sausar, Madhya Pradesh), *C. elliptica* Hislop (Nagpur). Besides these, *Gyrogonites medicaginula* Lamarck (Sighpur) and *Niellites sahnii* Horn. et Rautzien are also known.

Rhodophyta

Among the Solenoporaceae, the following are represented from Indian beds: *Solenopora tiruchiensis* Rao and Gowda (Niniyur), *S. sahnii* Rao and Gowda (Cullygoody), *S. jurassica* Nich. (Cullygoody), *S. coromandelensis* Rao (Cullygoody), *Parachaetete asvapati* Rao and Pia (Niniyur), etc. The Corallinaceae is represented by *Archaeolithothamnion* sp. Rao (Niniyur), *A. samanensis* Rao (Lockhart, Samana Range), *A. ranikotensis* Rao (Lockhart, Samana Range), *A. lugeoni* Pfender (Niniyur), *A. provinciale* Pfender (Niniyur), *A. lycoperdioides* Nicholin (Niniyur), *A. sp.* (Laki beds), *Lithothamnion* sp. Rao (Pondicherry), *L. sp.* Rao and Prasannakumar (Cullygoody), *Lithophyllum lockhertii* Rao (Lockhart), *Mesophyllum daviesii* Rao (Lockhart), *M. lakiense* Varma (Laki beds), *L. punjabense* (Laki beds), *Melobesia* (Lithoporella) cf. *concreta* Foslie (Lockhart) and several others.

Bacillariophyta

The Karewa beds of Kashmir have revealed the following species: *Caloneis schumanniana* (Grun.) Cl. var. *breviconstricta* Grun. f. *brevistriata* Iyengar and Subrahmanyam, *Cocconeis placentula* Ehrenb., var. *euglypta* Cl., *Cymbella leptoceros* Grun., *C. parva* Cl., *C. aspera* Cl., *Cyclotella meneghiniana* Kutz., *Epithemia zebra* Kutz., *E. sorex* Kutz., *E. sorex* Kutz., var. *gracilis* Hust., *Eunotia robusta* Ralfs., *E. valida* Hust., *Fragilaria construens* (Ehrenb.) Grun., *Melosira distans* (Ehrenb.) Kutz., *Pinnularia dactylus* Ehrenb. var. *hyalina* Iyengar and Subrahmanyam, *P. gibba* Ehrenb., *P. viridis* Ehrenb., *Stauroneis phoenicenteron* Ehrenb.

The fossil diatoms records are also several. They are from Nicobars, Nancowry, Maldives and other places. The scientific reports on the Novara Expedition, Vega Expedition and the Swedish Deep Sea Expedition also refer to them. The fossil diatoms from Colebrook Island include *Rossiella paleacea* Desikachary and Maheshwari, *Coscinodiscus superbus* Hardim., *Arachnodiscus ornatus* Ehrenb., *Asteromphalus flabellatus* (Breb.) Grev., *Hemiaulus polymorphus* Grun., *Rhaphoneis elegans* Pant. and Grun., *Xanthiopyxis oblonga* Ehrenb., and others (Desikachary and Maheshwari, 1958).

The Silico-flagellates are represented by several species, some among which are: *Mesocena polymorpha* Lemm. var. *triangula* (Ehrenb.) Lemm., *M. polymorpha* Lemm., var. *quadrangula* (Ehrenb.) Lemm., *Dictyocha*

tricantha Ehrenb. f. *minor* Schulz., *D. floula* Ehrenb., f. *aspera* Lemm., *D. fibula* Ehrenb., f. *rhombica* Schulz., *D. siderea* Schulz. f. *quadrata* Schulz., *Distephanus crux* (Ehrenb.) Haeckel, *D. crux* (Ehrenb.) Haeckel var. *octo-*
canthus Desikachary and Maheshwari, *D. speculum* (Ehrenb.) Haeckel, *Cannopilus hemisphericus* (Ehrenb.) Haeckel.

Apart from these, *Euglena* sp., *Botryococcus braunii* (Palena beds, Bikaner), *Algites*, cf. *A. moyrati* Fisch-Oust. *A. intricatus* Sternb., *A. targionii* Brong., are also known from early Tertiary and Cretaceous beds of India. The limestone near Rayalecheru (Anantapur Dt.) possessed primitive algal groups characterized by encrusting types (most abundant), annular types (next abundant) and filamentous and tubular types (as solid filaments and as hollow filaments) and branching types.

The records of fossil algae from India include several new discoveries and new species from Indian strata. The discoveries of these fossils have also revealed quite a number of interesting facts, among which a few only may be mentioned here.

The discovery of abundant *Lithothamnion* in Cullygoody, which is even earlier than the Niniyur groups in the Trichinopoly Cretaceous, indicates that these Lithothamnia were abundantly present during the Cretaceous periods in India, and that they have played a most important role as limestone builders in the Upper Cretaceous beds of South India (Rao and Prasannakumar, 1932). The genus *Clypeina* is met with in Eocene and Jurassic beds, but *C. sahnii* Varma is the first record of this genus from India from Mattur in the Cretaceous Trichinopoly series. Likewise the discovery of *Solenopora* in Trichinopoly Cretaceous by Rao (1946) is the first record of an undoubtedly marine Jurassic fossil from an area hitherto considered to be exclusively Cretaceous.

The fossil discoveries from the Lockhart series indicate that the Lockhart sea was probably a very shallow one and not more than about 25 fathoms deep (Rao, 1941). The Niniyur beds of Trichinopoly Cretaceous contain several marine fossils, representing Dasycladaceae, Solenoporaceae, Corallinaceae, etc. The richest development of Dasycladaceae (Chlorophyta) with Solenoporaceae and Corallinaceae (Rhodophyta) would seem to indicate that these algal flora flourished luxuriantly in a shallow sea, not more than 10 to 20 fathoms deep in the Niniyur region of Trichinopoly (Rao and Pia, 1936).

The genus *Pterophyton* is known as an important reef former of the Lower Cretaceous. The discovery of *Pterophyton indica* by Rao from Trichinopoly and Pondicherry is very important as it confirms the theory of marine transgression along the Coromandel coast in the Lower Cretaceous period (Sahni and Sitholey, 1943).

HIGH-ALTITUDE ALGAL FLORA

Although no concerted efforts were made to explore the high ranges for the algal flora they support, the occasional collections made by a few botanists throw some light on the nature and composition of the algal flora at high altitudes. Kurz collected in 1869 *Scytonema aureum* Menegh. between 450 m. and 600 m. at Punkabare in Sikkim. I. H. Burkhill made a good collection of algal species from various places at higher ranges above 600 m. and up to 3,000 m. during the years 1906-1912, which gave several new discoveries. Among these are *Symploca thermalis* (Kutz.) Rabenh., *Scytonema subtile* Moeb., *Diatoma hiemale* (Lyngb.) Hein var. *mesodon* Kutz., *Eunotia pectinalis* (Dillw.) Rabenh., *Navicula lanceolata* Kutz. var. *cymbula* Cl., *Oocyctis solitaria* Witt., *Debarya desmidoides* W. and G. S. West., var.

orientale Carter, *Cosmarium garrolense* Scott, and others (Carter, 1928). Philipose (1953) recorded from high elevations at Shillong at 1,450 m. and from Coonor in Nilgiris at 1,800 m. some species. Randhawa collected from Kumaon Hills, Almora, and Himalayas, at 1,650 m. *Sirocladium kumaoensis* Randhawa which provided the material for his creating the new genus *Sirocladium* and *Zygnema himalayensis* Randhawa from a freshwater stream at Loharkhert at 1,725 m. in Almora on the way to Pindari Glaciers. Foreau collected several Cyanophyta from Shenbaganur in the Palni Hills, in South India, between 1,560 m. and 1,800 m., during 1929-1930, which were reported by Fremy (1942). In this several new discoveries are seen. Some among them are *Lyngbya porphyrosiphonis* Fremy, *Oscillatoria foreaui* Fremy, *Fremyella bossei* Fremy, *Aulosira aenigmatica* Fremy and others. Carter (1871) reported *Ceratium kumaoenense* Carter from Naini Tal which organism was found in all lakes of Kumaon between 1,200 m. and 1,950 m. imparting a rusty brown colour to the water, due to the presence of myriads of these organisms which were perfectly visible to the eye on surface, 3 m. to 4.5 m. down and very few below 6 m. and none at all at the bottom of the lake.

Randhawa made good collections in 1938 from Binsar and Gananath at 1,800 m.-2,100 m. and from Dhakuria on the Pindari Glacier route in Almora District on the Himalayas at 2,550 m. Among the algae in these collections are *Aphanocapsa pulchra* (Kutz.) Rabenh., *Chaemosiphon subglobosum* (Rostaf.) Lemm., *C. curvatus* Geitler, *Spirulina nordstedtii* Gomont, *S. laxa* Smith, *S. subsalsa* Oerst., *Oscillatoria ornata* Kutz., *O. proboscidea* Gomont, *O. quadripunctata* Bruhl et Biswas var. *unigranulata* Singh, *Lyngbya epiphytica* Hirn., *Scytonema ocellatum* Lyngb., *Nostoc* sp. (Venkataraman, 1958).

Fossil diatoms of Karewa beds, exposed at 2,700 m. at Gulmarg, Kashmir, have already been mentioned earlier. Among the new finds are *Caloneis schumanniana* (Grun.) Cl., var. *biconstricta* Grun. f. *brevistriata* Iyengar and Subrahmanyam, and *Pinnularia dactylus* Ehrenb., var. *hyalina* Iyengar and Subrahmanyam (1943). Bharadwaja (1936) recorded *Hydrurus foetidus* Ag. from a cold stram at Kashmir at 2,700 m. Kurz's collections of Sikkim Himalayas between 2,100 m. and 3,000 m. include *Oscillatoria interrupta* Martens, *O. brevis* Kutz., *Spirogyra decimina* Link., *Zygnema insigne* Kutz., *Vaucheria* sp., *Chroolepus villosum* Kutz. and others. Lagerheim described some desmids from *Utricularia* sp. collected from Tibet over 3,300 m. among which are *Hyalotheca dissiliens* (Smith) Breb., *Euastrum binale* Ralfs., *Cosmarium granatum* Breb., *Staurastrum leptodermum* Lund and *Pleurotaenium* sp. (Lagerheim, 1888). From Sikkim Himalayas at Sandokphu Ridge at 3,570 m. *Vaucheria aversa* Hassal was reported by Biswas (1949) and from Amarnath Cave at Kashmir at 3,820 m. *Vaucheria terrestris* Lyngb. em. Walz. was recorded (Venkataraman, 1961). Hutchinson (1933) refers to algae at Ladakh, in West and Indian Tibet and the Punjab, observed during the Yale North India Expedition of 1932 from hot springs at high altitudes from Kyam-spring at 4,690 m. in the valley of Chang-Chanmo River. Drouet (1938) gives an account of the high-altitude species, and among the species are *Gloeocapsa arenaria* (Hass.) Rabenh., *Gomphosphaeria apionina* Kutz., *Chaemosiphon incrustans* Grun., *Nostoc rivulare* Kutz., ex Born. et Flah., *N. commune* Vauch. ex Born. et Flah., *N. pruiniforme* (L.) Ag. ex Born. et Flah., *Phormidium treleasei* Gom., *P. laminosum* (Ag.) Gom. and *Oscillatoria okani* Ag. ex Gom. From Ladakh at 5,100 m. *Amphithrix janthina* (Mont.) Born. et Flah. and *Phormidium autumnale* (Ag.) Gomt. are reported. Sir George Watt collected algae from Upper Batong valley of

Sikkim between 4,500 m. and 5,400 m., among which are *Vaucheria*, *Oedogonium*, *Zygnema*, *Desmids*, *Diatoms* and blue green algae (Dickie, 1882).

DEEP SEA ALGAE

The algal vegetation of the Indian coasts, particularly of the Intertidal belts is known largely through the works of Boergesen (1930, 1931, 1932, 1933, 1934, 1935, 1937, 1938). The deep-sea forms are comparatively little known as there does not appear to have been any serious attempt made to dredge algae from the great depths of our seas. However, some interesting forms have been reported, the greatest depth from which algae dredged being not exceeding 20 metres.

Among some of the algae new to science, dredged from various depths from Indian coasts, are *Champia indica* Boergs., from Okha Port at about 8 metres, *Willeella ordinata* Boergs., *Scinaia indica* Boergs. at 10 metres at Okha Port, and from Tuticorin in South India, *Struvea tuticorinensis* Boergs., at about 12 metres, *Lynkiella karuvalensis* Varma at 14–18 metres, and *Chondria transversalis* Boergs. at 20 metres. *Willeella* and *Lynkiella* are the two new genera erected from such dredged algae by Boergesen (1930) and Varma (1960) respectively. Besides these, some deep-water algae, which were cast ashore, are also known from our coasts. They are not, however, given in this account.

ALGAE OF HOT SPRINGS

Kirtikar (1886) recorded and named an alga as *Conferva thermalis birdwoodi*, which was not unlike *Entheromorpha percursa* from the hottest spring, Gorakha Machindra, Vajrabhai near Bhiwandi in Thana in Bombay, the temperature of the spring being 54·4° C. Prain (1893) gave some interesting forms from Barren Islands. At Landing Bay at Barren Islands, the boulders and stones on the beach were found bathed by water from a hot spring, the temperature being 41·1° C. Considerable quantities of *Calothrix pulvinata* Ag. were found on such substrata. Several species were also found in the hot springs at high altitudes from Kyam-spring in Ladakh Ranges. Among them are *Gomphosphaeria aponina* Kutz. at 22·6° C.–25·6° C., *Gloeocapsa arenaria* (Hass.) Rabenh., *Oscillatoria okani* Ag. ex Gom. at 43·5° C. and *Phormidium laminosum* (Ag.) Gom. at 46° C. (Drouet, 1938). Goncalves (1947) gave an account of the algal flora of the hot springs of Vajreshwari near Bombay, among which are species of *Aphanocapsa*, *Gloeocapsa*, *Aulosira*, *Plectonema*, *Scytonema*, *Anabaena*, *Spirulina*, *Oscillatoria*, *Phormidium*, *Lyngbya*, *Rhopalodia*, *Nitzschia*, etc. Of these, between 40° C. and 49° C., the species met with are *Aphanocapsa thermalis* Brugg., *Oscillatoria jasorvensis* Vouk. and *Plectonema gracillimum* (Zopf.) Hansg., at 54° C., *Phormidium africanum* Lemm., and at 57·5° C., *Anabaena* sp.

NEW GENERA AND NEW FAMILIES

During the eighteenth century, the collection and record of algae were made on scientific basis, though the progress was somewhat slow due to inherent difficulties in the early years in the matter of collection and study. During the twentieth century, great strides were, however, made with even erecting new families and new genera, and quite a number of new species, which mark an outstanding event in the history of Indian Algology. The various discoveries made have been dealt with elsewhere by the author, and the more salient features only are outlined here.

Among the new genera erected, the following may be mentioned:

Chloranomala with species *C. palmelloides* Mitra (Palmellaceae).

Ecballocystopsis with species *E. indica* Iyengar (Chlorodendraceae).

Dendrocystis with species *D. raoi* Iyengar (Oocystaceae).

Characiosiphon with species *C. rivularis* Iyengar (Characiosiphonaceae).

Heterothricopsis with species *H. viridis* Iyengar and Kanthamma (Ulothrichaceae).

Gloeotilopsis with species *G. planctonica* Iyengar and Philipose (do).

Cylindrocapsopsis with species *C. indica* Iyengar (Cylindrocapsaceae).

Fritschella with species *F. tuberosa* (Chaetophoraceae).

Sirocladium with species *S. kumaoense* Randhawa (Zygnemaceae).

Triplastrum with species *T. indicum* Iyengar and Ramanathan (Desmidiaeae).

Willella with species *W. ordinata* Boergessen (Anadyomenaceae).

Protoeuglena with species *P. noctiluca* Subrahmanyam (Euglenaceae).

Hornellia with species *H. marina* Subrahmanyam (Chloromonadineae)

Cladospongia with species *C. elegans* Iyengar and Ramanathan (Craspedomonadaceae).

Hamelella with species *H. geminifructus* Boergs.

H. dermonematis Boergs. (Myrionemataceae).

Lynkiella with species *L. karuvalensis* Varma (Lophothaliaceae).

Anabaenothrix with species *A. epiphytica* Randhawa and Ghose (Cyanophyta).

Mastigocladiopsis with species *M. jogensis* Iyengar and Desikachary (do).

Westiellopsis with species *W. prolifica* Janet (do).

Thackerella with species *T. indica* Bharadwaja (do).

Iyengariella with species *I. tirupatiensis* Desikachary (do).

The new families erected are Characiosiphonaceae by Iyengar and Corynomorphaceae by Balakrishnan.

Among the various new discoveries, some features of special interest are noticed, and a few examples are given here. Some are known so far to be monotypic, e.g. *Fritschella tuberosa* Iyengar, *Characiosiphon rivularis* Iyengar, *Iyengariella tirupatiensis* Desikachary, and the other monotypic genera being *Cladospongia* Iyengar and Ramanathan, *Cylindrocapsopsis* Iyengar, *Westiellopsis* Janet, *Ecballocystopsis* Iyengar, *Lynkiella* Varma, *Thackerella* Bharadwaja, *Heterothricopsis* Iyengar and Kanthamma, *Dendrocystis* Iyengar, *Gloeotilopsis* Iyengar and Philipose, *Hormidiella* Iyengar and Kanthamma, and some others. *Fritschella tuberosa* Iyengar is further interesting as this alga is of great phylogenetic importance in tracing the evolution of higher land plants, the heterotrichous filament being regarded as the probable starting-point for the evolution of land plants (Fritsch, 1945).

In concluding, it may be stated, that no attempt is made here to give the latest nomenclature of the species occurring in various places in the text, and they are to a great extent retained as they were published earlier, in the particular literature. It is hoped, however, to catalogue a complete list of Indian Algae, so far published and known, wherein, it is hoped, to deal with their latest nomenclature as well in a future publication.

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ŚĀNKAR-MADHĀ AT KUNDA, DISTRICT JABALPUR

By DEBALA MITRA

Located in the mauza of Kunda, the temple locally known as Śāṅkar-madhā (Śāṅkar-matha), is a tiny, single-celled and unpretentious shrine with a flat roof, about 5 miles north-east of Bohribund Police-station and 3 miles east of Tigowa. A small stream, called Gomati, flows between the site and the nearest habitation of Hinawati, the latter being about two furlongs from the temple.

Dedicated to a *linga*, the temple faces east. Made of red sandstone of mostly mottled variety, the ashlar masonry is without any binding medium. The use of iron for joining the stones is extremely limited. Two chases for iron cramps were alone noticed. The stones are chiselled and smoothly finished. In the masonry, long blocks, to the extent of covering the entire width of the interior wall, have been used in some parts. The walls, with the exception of the topmost course below the roof, are faced inside and outside with stretcher courses, the core between the two facings being filled in with loose rubble of small dimensions. As a result of this lack of proper bonding of the two faces and also due to their tilting at opposite directions, the two facings have been separated leaving a wide gap in the core of the wall in most places. The topmost course below the roof consists of wide slabs, each slab covering the entire thickness of the wall.

In terms of the terminology of the later temples, the elevation of the temple may be divided into *pābhāga*, *jāṅgha*, *barāṇḍa*, *kāṇṭi* and roof.

The *pābhāga* is a *khurā* (1 ft. $2\frac{1}{4}$ in. high without *muhāṇṭi*), with its body slightly rounded at the top edge and crowned by a receding *dhāra*. Its *muhāṇṭi* is formed by the slightly projecting course below it. The exact height of the *muhāṇṭi* is not certain. More than half of this course is chiselled, the lower part left unattended to. The topmost part of the chiselled portion is finished to a depth of $1\frac{1}{2}$ in. Whether this finished part alone was intended to be seen or the entire chiselled part (its height is $4\frac{1}{2}$ in. on average) could not be determined due to the denudation of the floor around it, as a result of which the course below the *muhāṇṭi*-course is exposed. The channel, for the drainage of water from the *garbha-griha*, forms part of the *muhāṇṭi*-course of the north side. As the height of the channel at the mouth is 4 in., the *muhāṇṭi* at this side at least is not less than 4 in.

Made of six courses, the *jāṅgha* is austere plain and 5 ft. $2\frac{1}{4}$ in. (without joints) high.

The *barāṇḍa* (11 in. high) is a single course with a receding facet below and above, its top edge being slightly rounded. It is on one plane with the architrave above the lintel of the door and projects beyond the alignment of the *jāṅgha* and *kāṇṭi*.

Two plain courses comprise the *kāṇṭi* (1 ft. $\frac{1}{2}$ in. without joints).

Above this comes the ceiling-cum-roof ($6\frac{1}{4}$ in. high at the southern end), composed of two long massive slabs (the western one is 11 ft. 1 in. long without the spout) placed side by side with their shorter sides towards the north and south. At the base of these two slabs is a receding facet which, however, projects beyond the *kāṇṭi*. A part of the eastern slab is missing. The western slab is now fractured centrally into two. As seen from the

top, the edge of both the slabs is raised by a flanking continuous channel which ultimately joins a projected open spout¹ (western one broken) on the central part of the north side for the discharge of rain-water. The central part of the roof slopes towards the channel. The two slabs were originally clamped together by cramps, presumably of iron, one each near the end. The cramps have disappeared, leaving the chase and socket (the northern one is 2 $\frac{1}{2}$ in. deep and the southern one 3 in. deep). How the junction between the two slabs was protected from rain-water cannot be determined. There is no trace of plaster, nor of concrete. Neither is there any trace of the slab which might have covered the junction. From the centre of the south face of the western slab comes out a lug-like projection with a central hole. The front of this lug is broken. Perhaps this socket was intended for the pole of a banner.

The total height of the temple from the top of the *muhāṇḍi* of the *khurā* to the top of the roof is 8 ft. 11 $\frac{1}{2}$ in. without joints and 9 ft. 1 in. with joints.

Door-frame.—The uncarved monolithic jambs are divided into three facets: the innermost is the most recessed and narrow, while the outermost the most projected and broadest. The ends of the lintel prolong beyond jambs, evidently in imitation of the wooden prototypes. The lintel is also in three facets in continuation of the facets of the jambs. The outermost facet at either end is mostly recessed to receive perhaps the detachable bracket-figure supporting the architrave above the lintel.

The height of the door-opening above the roughly-dressed sill is 4 ft. 5 in. The width of the opening is exactly half, being 2 ft. 2 $\frac{1}{2}$ in. The sill, placed between the jambs, is 2 ft. 2 $\frac{1}{2}$ in. long, 1 ft. 1 $\frac{1}{2}$ in. to 1 ft. $\frac{3}{4}$ in. wide and 7 $\frac{1}{2}$ in. high. The northern jamb is 5 ft. 6 $\frac{3}{4}$ in. high, so that a portion (5 ft. 6 $\frac{3}{4}$ in.—5 ft. $\frac{1}{4}$ " = 6 $\frac{1}{4}$ in.) goes below the bottom-level of the sill.

Architrave.—The architrave, which projects above the lintel and prolongs beyond the lintel, is divided into corbel-wise facets, three near the ends and four in the middle. The topmost facet, which is the broadest and the most projected, bears representations of beam-ends. Whether the architrave extended along the entire length of the front side cannot be determined as the facing of the walls flanking the extant monolithic architrave is missing. Above the architrave is the *kāṇḍi* of two courses over which rests the roof.

The sanctum is rigorously plain. Some of the stones forming its walls, as already noted, cover the entire length of the interior. Internally it is 5 ft. 7 in. (west wall, as measured by the length of a single stone) \times 5 ft. 10 in. (south wall; 5 ft. 10 $\frac{3}{4}$ in. north wall); thus it is not a perfect square. As the exterior measurements of the west and north walls above the *muhāṇḍi* are 10 ft. 8 $\frac{1}{2}$ in. and 10 ft. 10 $\frac{1}{2}$ in. (without the space for joints) and as the projection of the *muhāṇḍi* of the *khurā* is 1 $\frac{1}{2}$ in. to 1 $\frac{1}{4}$ in., the thickness of the wall at the *muhāṇḍi* is slightly less than half of the length or width of the *garbhagriha*. Some part of the masonry was found covered with mud-plaster.

There had been a wooden door with two leaves, as suggested by the two sockets (for the poles of the leaves) in the recessed part of the lintel, which projects beyond the inner face of the jambs.

The enshrined *linga* is square below, octagonal in the middle and circular above. The octagonal portion is fixed into the octagonal socket

¹ The projection of the eastern one is 1 ft. $\frac{1}{2}$ in. long and 1 ft. 4 in. wide, the width and depth of the channel proper being 4 $\frac{1}{2}$ in. and 3 $\frac{1}{2}$ in. respectively.

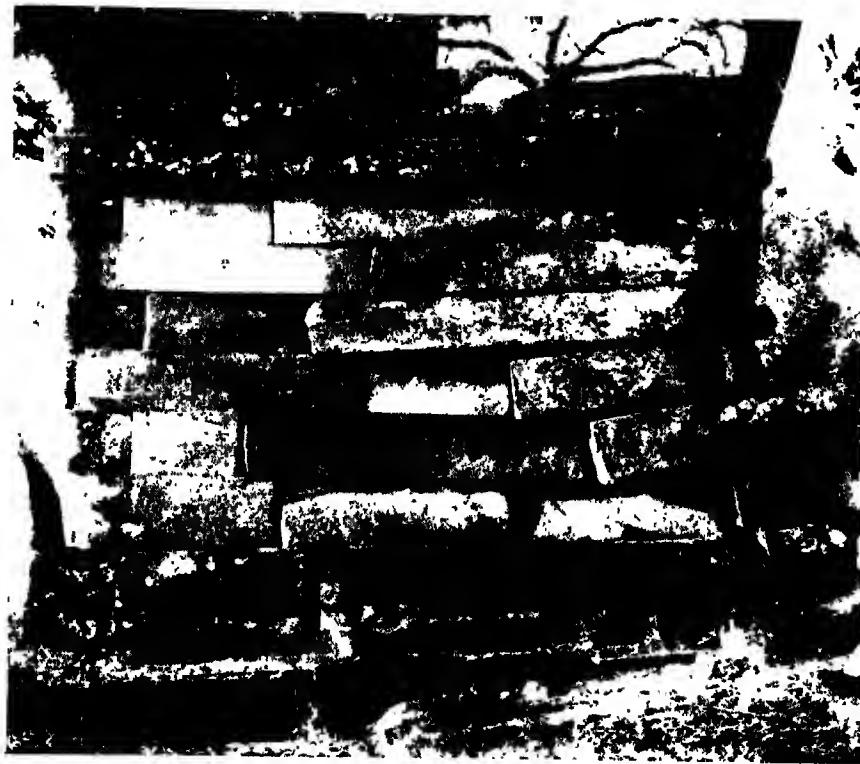
of a monolithic *arghya-patta*. The visible circular part above the octagon is nearly 1 ft. high and $10\frac{1}{2}$ in. in diameter at the base. The *arghya-patta*, moulded into an inverted *khurā*, is circular with a projected channel towards the north. The major part of the *arghya-patta* is embedded in the floor. A drain has been cut into the floor just below the *arghya-patta* channel. This drain, after taking a turn towards the west near the north wall, joins the channelled stone, which covering the entire thickness of the north wall projects outside.

The floor of the sanctum slopes towards the north wall where it is in one plane with the top of the *mūhāñji*-course of the exterior wall.

The original planning of the temple did not provide for a porch, as may be presumed from the absence of pilasters in the front wall. The addition of a portico at a later date, however, is vouched by the fragmentary shafts of two pillars and fragments of the roof-slab. One of the pillar-fragments is reported to have been removed to the adjoining village of Pipariya by a person named Harbhajan Gautam. The other (Pl. VIA) is still at the site. Its available height above the ground is 2 ft. 6 in. Stylistically and in point of treatment it is closely affiliated to the pillars of the Kānkāli-devi temple of Tigowa. It is square below, next octagonal, then sixteen-sided with a row of rising petals in the upper part, next circular (and slightly recessed like necking) and then again sixteen-sided with a row of falling petals. Above this is a projected lotus, receding from which is a garland which served the base for the missing *pūrṇa-kumbha*. One fragment of the roof-slab preserves an arc of a circle bordered by a cable-pattern resembling that around the lotus-medallion of the ceiling of the portico of the above-mentioned Gupta temple of Tigowa. Save for these fragments nothing would indicate the presence of the portico. Even its plan cannot be made out. Fragments of the roof-slabs and some fallen stones of the temple have been used to raise a rough improvised platform in front of the sanctum. The top of this platform is nearly in one level with that of the sill. The clearance may shed some further light on the portico.

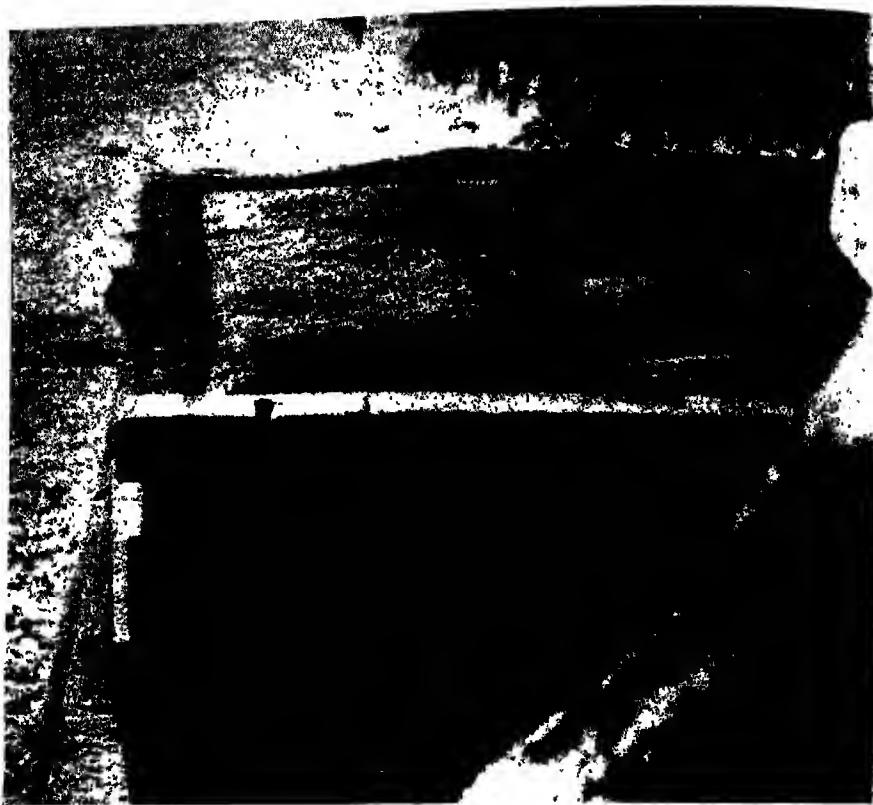
The temple, with its flat roof, prolongation of the lintel, bracket-figures (missing) supporting the architrave and moulding in continuation of the architrave, evidently pertains to the class of the Gupta temples. The addition of a portico (not anticipated originally) in the style of that of the Kānkāli-devi temple possibly indicates that it is earlier than the Tigowa specimen.¹

¹ Photographs published here are the copyright of the Archaeological Survey of India.



A General view of old Gupta temple from south, Kunda, Jabalpur Dist.





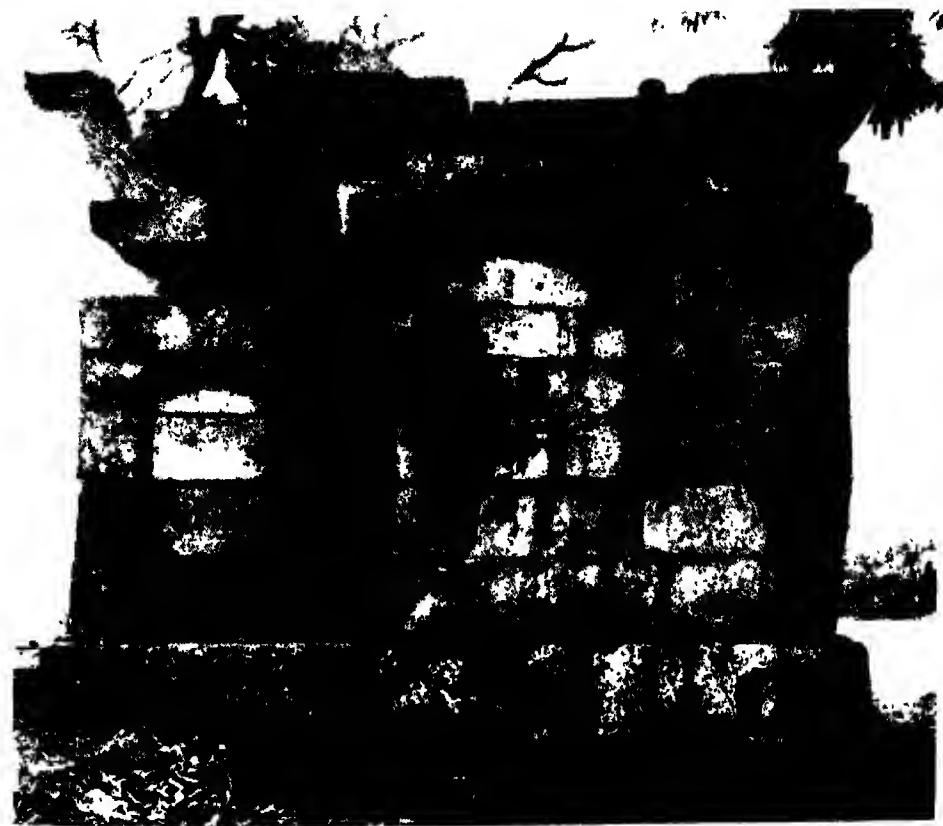
A. Roof slab of old Gupta temple, Kunda, Jabalpur Dist.



B. General view of old Gupta temple from south-west, Kunda, Jabalpur Dist.



A. Roof slab of old Gupta temple, Kunda, Jabalpur Dist.



B. General view of old Gupta temple from north, Kunda, Jabalpur Dist.



A. View from east, old Gupta temple, Kunda, Jabalpur Dist.



B. General view of old Gupta temple from south, Kunda, Jabalpur Dist.



V.—General view of old Gupta temple from north, Kunda, Jabalpur Dist.





Broken pillar of the old Gupta temple, Kunda, Jabalpur Dist.



ELLIPTICAL STRUCTURES IN ANCIENT INDIA

By H. SARKAR

Elliptical structures of ancient India are not widely known and the general absence of their reference in leading books on ancient Indian architecture may even cast a doubt as to their very existence. But elliptical structures corresponding to a linear plan with semicircular ends¹ did exist and, as will be shown presently, this constructional form, despite its exiguity in India, appears to be a very old idea, possibly older, at least archaeologically, than the circular and apsidal ones.

Structures with truly oval or elliptical ground plan are, however, extremely rare in India. Hence, Coomaraswamy's statement that 'an oval plan is unknown to Indian architecture'² is not very wide off the mark, for, with the probable exception of the Lomas Rishi cave, no structure with truly elliptical plan has so far come to light.

Generally, scholars have described the 'cella' of the Lomas Rishi cave (Pl. I, fig. 1) in the Barabar Hill as circular or, more precisely, an incomplete circle. It does not appear to be an unfinished cave so far as the ground plan is concerned inasmuch as the wall of the cella, though not polished, bears a smoothed surface.³ In all likelihood it was intended to be an oval shrine (longer axis 17 ft. or 5·2 m. and shorter axis 14 ft. or 4·3 m.) used as a place of worship by the Ājīvikas. Yet, this is the only example of truly oval ground plan in India and it answers correctly to the description of *kukkuṭa-anda-sadriṣṭa* as given in some Southern texts.

No less than half-a-dozen ancient sites, viz. Rajgir, Gopika or Nagarjuni cave, Besnagar, Nagari, Kauśāmbī and Śrāvasti, have produced evidence of linear structure with semicircular extremities; for the sake of convenience such structures will be referred to in these pages as elliptical. Perhaps this form of ground plan is referred to in the Southern texts as *vṛittāyata*.

The majority of the above-mentioned sites, viz. Rajgir, Gopika cave, Śrāvasti and Kauśāmbī, are confined to the Ganga basin which seems to be the cradle of this type of architectural plan. With the exception of the Gopika cave in the Nagarjuni Hill all of them are attributed to the Buddhists. But the elliptical shrines of Besnagar and Nagari, both being in Central India, belonged to some Vaishnava sect; a Buddhist cave at

¹ Such structures have already been described as elliptical by D. R. Bhandarkar and other excavators.

² Ananda K. Coomaraswamy, 'Indian Architectural Terms'. *Journal of American Oriental Society*, Vol. 48 (New Haven, 1928), p. 259. He also thinks that P. K. Acharya in his *Indian Architecture according to the Mānasāra-śilpasāstra* and in *A Dictionary of Hindu Architecture* refers to the term oval, perhaps meaning apsidal. The *Silparatna* and other Southern texts mentioned oval or elliptical form as *vṛittāyata* or *kukkuṭa-anda-sadriṣṭa*. Information from Sri K. R. Srinivasan, Deputy Director-General, Archaeological Survey of India.

³ M. M. Hamid Kuraishi, *List of Ancient Monuments Protected under Act VII of 1904 in the Province of Bihar and Orissa*. Archaeological Survey of India, New Imperial Series, Vol. LI (Calcutta, 1931), p. 36. He describes the cave as follows: 'The whole interior of the circular room has been left rough, and both the floor and roof of the outer apartment remain unfinished, and while the straight walls of this latter apartment are polished, the curving outer wall of the circular room is only smoothed—not polished.'

Kolvi in Madhya Pradesh is, however, described as a long ovoid cave measuring 21 ft. \times 16 ft.¹ (6.4 \times 4.9 m.).

The earliest elliptical structures appear to be the Jivakāmravana monastery (Pl. I, fig. 2) at Rajgir, built by the famous physician, Jivaka, in Buddha's life-time: the archaeological excavations at the very site revealed a monastic complex comprising a few rectangular and elliptical halls.² At least two phases of building activity were noticed there, both being associated with elliptical halls. That these were used as halls may be affirmed from the occurrence of two openings on one side in at least three cases. As already indicated, the builders there tried to achieve the elliptical form simply by making both the ends pronouncedly convex, the longer sides being almost parallel to each other.

These ruins of rubble-built structures at the site of the Jivakārāma are considerably old, perhaps older than any monastery hitherto unearthed in India. The coarse red ware, which the site yielded in plenty, appears to be the same as that of Period I at Rajgir of Ghosh's chronology,³ and, as such, may be dated to pre-N.B.P. period (earlier than the fifth century B.C.). Another excavation at Rajgir⁴ also established the chronological priority of coarse red ware over the Northern Black Polished Ware. Hence, the site, inclusive of the elliptical halls, may be dated to *circa* sixth-fifth century B.C.⁵ It is interesting to record that neither any *stūpa* nor any shrine seemed to have existed at the place.

Next in order, both geographically as well as chronologically, comes the Gopika or Nagarjuni cave in the Nagarjuni Hill, District Gaya, Bihar, ascribable to the third century B.C., as it bears the dedicatory inscription of Daśaratha, a Maurya king. Unlike Sudama or Lomas Rishi cave in the Barabar Hill it has no separate cells; consisting mainly of a single hall the cave measures 46 ft. 5 in. \times 19 ft. 2 in. (14.15 \times 5.8 m.) and is entered by a passage in the middle.⁶ In plan the rock-cut chamber, without any pillar, resembles very much the elliptical halls at Rajgir (Pl. II, fig. 1). The vaulted roof of the Gopika cave rises to 10 ft. 6 in. (3.2 m.) at the centre and the entire structure was probably a rock-cut replica of a thatched or wooden building then in vogue. From the design of the cave-roof one may also visualize the picture of the roof⁷ of the Rajgir halls.

Like the Jivakāmravana monastery at Rajgir, the Ghoshtārāma at Kauśāmbī is said to have been built by the merchant Ghoshita during the life-time of Buddha. An inscription⁸ of the first century A.D., discovered by G. R. Sharma, gives the correct location of the monastery which remained

¹ E. Impey, 'Description of the Caves of Koolvee, in Malawa'. *The Journal of the Bombay Branch of the Royal Asiatic Society*, Vol. V (Bombay, 1857), p. 344.

² *Indian Archaeology, 1954-55—A Review*. Pp. 16-17; also *ibid.*, 1958-59, p. 13.

³ A. Ghosh, 'Rajgir, 1950'. *Ancient India*, No. 7, p. 71.

⁴ *Indian Archaeology, 1953-54—A Review*, p. 9.

⁵ Should it mean that the Northern Black Polished Ware, generally abbreviated as the N.B.P. Ware, did not make its appearance there during the life-time of Buddha? The characteristic ware is now dated to *circa* sixth century B.C. to second century B.C. As full report on this excavation is not available as yet, conclusions regarding the date of the structures may be taken as tentative.

⁶ Alexander Cunningham, *Four Reports made during the Years 1852-55*. Archaeological Survey Report, Vol. I (Simla, 1871), p. 48. Also, A. L. Basham, *History and Doctrines of the Ajivikas*. Pp. 154 ff. (London, 1951).

⁷ It appears from N. V. Mallaya's *Studies in Sanskrit Texts on Temple Architecture (with Special Reference to Tantrasamuccaya)*, pp. 68-89, that like apsidal shrines the elliptical structures (*vrittayata*), too, had roofs shaped like the back of an elephant (*gajaprichphākara*).

⁸ A. Ghosh, 'Buddhist Inscription from Kauśāmbī'. *Epigraphia Indica*, Vol. XXXIV, Pt. I (1961), pp. 14-16.

continuously under occupation from *circa* sixth century B.C. to the sixth century A.D.¹ To fix correctly the date of the elliptical structure which stood on an oblong platform is, however, difficult until the final report on the excavation is published. Here also the elliptical structure followed a plan very much similar to the Rajgir halls and the Gopika cave.

The elliptical structure at Kauśāmbī (Pl. II, fig. 2) was made of brick and might have been a *stūpa*. Yet, this is not the only elliptical structure in brick as the mound known as Pakki Kuti at the modern village of Maheth, embracing a part of ancient Śrāvasti, also yielded a similar monument (Pl. III).² Unlike Kauśāmbī it had a central projection, or some sort of a passage, on the east, a characteristic noticed also in the case of circular *stūpa*-shrines and Vaishnavite elliptical temples. But for the central passage, the example from Śrāvasti did not differ much from that of Kauśāmbī. Both the structures were built on high platforms divided into several squares, and as usual the western side of the ellipse in either case was almost straight. The method of constructing a platform by dividing it into several compartments was meant for economizing materials, a principle followed also in case of wheel-shaped *stūpas*.³ Such technique marked a phase of constructional advancement over the earlier method of solid constructions of *stūpas* or platform. *Stūpas* with wheel-shaped plan must have come into existence in the Gandhāra⁴ and Mathurā⁵ regions by about the first century A.D.; it is but natural that the principle followed in case of circular constructions would also be adopted in the same period for building platforms similar to those of Kauśāmbī and Śrāvasti; consequently, the present writer is inclined to date the elliptical structures at both the sites to about the first-second century A.D.⁶

This architectural form, as already stated, was accepted by the followers of Brahmanical faith; the shape of the ellipse, however, did not alter in the least. As early as 1918 Bhandarkar⁷ discovered an elliptical shrine, also enclosed by an elliptical wall, at Nagari, District Chitorgarh, Rajasthan: inscriptions—some of them dating back to the second century B.C.—recovered from the nearby sites suggest its Vaishnava affiliation. Again, the recent excavations near the famous Heliodorus pillar at Besnagar,⁸ District Vidisha, Madhya Pradesh, unearthed a temple-complex almost similar to that of Nagari. In both the cases the respective shrine was provided with a passage or a porch in the centre, a feature observed also at Śrāvasti. One may easily date the elliptical shrine at Besnagar to the second century B.C., for it is certainly contemporary, if not earlier, to the Heliodorus Garuda-pillar standing nearby—the inscription on the pillar being generally dated to the second century B.C.

¹ *Indian Archaeology, 1955-56—A Review.* Pp. 20-21.

² J. Ph. Vogel, 'Excavations at Saheth-Maheth'. *Annual Report of the Archaeological Survey of India, 1907-08* (Calcutta, 1911), pp. 108-09; also Pl. XXVIII.

³ H. Sarkar, 'Some Aspects of the Buddhist Monuments at Nagarjunakonda'. *Ancient India*, No. 16, pp. 78-82.

⁴ Sir John Marshall, *Taxila* (Cambridge, 1956), Vol. III, Pl. 45. The example from Sirkap is only a variant of this type of *stūpa*.

⁵ Vincent A. Smith, *The Jaina Stupa and other Antiquities of Mathura* (Allahabad, 1901), Pl. III.

⁶ This type of platform-construction in temple-architecture gained wide currency during the Gupta period.

⁷ D. R. Bhandarkar, 'The Archaeological Remains and Excavations at Nagari'. *Memoirs of the Archaeological Survey of India*, No. 4 (Calcutta, 1920), pp. 131 ff., Pl. XVIII.

⁸ *Indian Archaeology, 1964-65—A Review* (cyclostyled copy available with the Archaeological Survey of India); also information from Sri M. D. Khare, Assistant Superintendent, Archaeological Survey of India.

It is clear from what has been described above that already in the pre-Christian times the Buddhists, the Ājivikas and the followers of Brahmanical faith adopted the elliptical building plan. All the elliptical buildings, whether built in rubble, brick or rock, show more or less an identical plan wherein the lateral curvature of an ellipse was practically absent. Such consistency could not have been observed had there not been a definite tradition persisting in the country.¹ Yet, it is to be borne in mind that these structures were not put to an identical use, for whereas the halls at Rajgir and the rock-cut cave in the Nagarjuni Hill were mainly copies of a secular building plan, those of Kauśāmbī, Śrāvasti, Nagari and Besnagar might have been religious shrines. The elliptical structures from the first two sites are identified as *stūpas*, although the plan of the Śrāvasti monument conforms more to a shrine than a *stūpa* proper. Of the two kinds of buildings, viz. secular and religious, the former appears to have evolved earlier than religious ones and the latter had its continuity till the first-second century A.D. when the secular origin of this ground plan was practically forgotten.

It is already indicated that the elliptical structures of Rajgir were possibly used as residences of the Buddhist monks and that these were built by Jivaka during Buddha's life-time. That Buddhists did not evolve any building tradition of their own in the beginning is fairly certain. In the circumstances one has to assume the prevalence of such structures in some parts of India even prior to Buddha's time. The fact that both the Buddhists as well as the Ājivikas followed an identical plan speaks not only of a common heritage but also of a sense of catholicity in the selection of building plan which had then no religious bias. Evidently, both the sects depended on current styles without any preference or prejudice. Like the Buddhists the Ājivikas, too, had their regular places for meetings which is known as the Ājivika *sabhā*;² the Gopika, the Vāhiyaka and the Vadathika caves in the Nagarjuni Hill served as some sort of assembly halls. On the other hand, the Sudama and Lomas Rishi caves with circular or oval inner chambers might have been sanctuaries modelled like Buddhist *stūpa*-shrines. As both the doctrines believed in some form of corporate ideals it is but natural that necessity of such halls, used either as residence or as assembly halls, should be felt by either sect. All this presupposes the existence in pre-Buddhistic times of a building tradition suited to communal purposes. Unfortunately, no archaeological remains comparable to the elliptical halls, and also attributable chronologically to pre-Buddhistic period, have so far come to light. Some very important evidence is, however, available in the primitive architecture, specially among the Naga tribes of the North-East Frontier. For instance, the Bachelor's House (*Morung*) of the Lhota Nagas³ (Pl. IV) conforms exactly to the elliptical plan of Rajgir or Gopika cave; houses with semicircular front are also common amongst the Sema and the Lhota Nagas. Whether the Lhota dormitories should be considered as survival of an old tradition is difficult to say but the presence

¹ The tradition possibly continued in South India till late medieval times as the Ranganāthaśvāmi temple at Srirangam, District Thiruchirapalli, the Jarāhareśvara temple at Kanchipuram, District Chingleput, and Kallalagar temple at Alagarkovil near Madurai, all being in Madras State, are built on elliptical ground plan. Information from Sri K. R. Srinivasan.

² A. L. Basham, *op. cit.*, pp. 115-16.

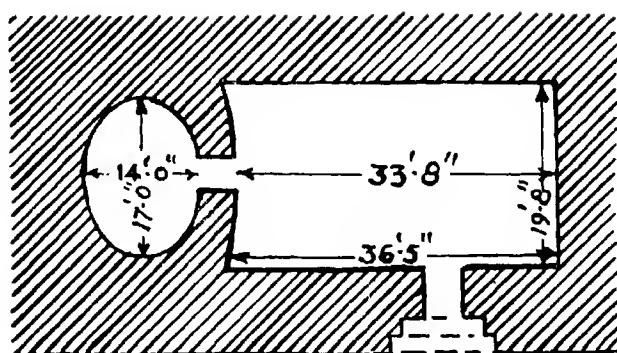
³ J. P. Mills, *The Lhota Nagas* (London, 1922), pp. 24 ff.; plate facing p. 25. The Bachelor's House is an institution common to most of the tribes in the North-East Frontier. Several tribes of Bihar and Madhya Pradesh follow the same custom. For distribution of village dormitories in India, see Verrier Elwin, *The Muria and their Ghōtul* (Oxford, 1947), pp. 289 ff.

of pile-dwelling, old traces of which are preserved in the plastic representations from Amaravati and in the Buddhist literature,¹ leads one to believe that elliptical plan as well as the pile-dwelling amongst some Naga tribes perhaps constitute the lingering vestiges of some ancient customs. Needless to say, these tribal dormitories were also meant for communal living and one may wonder whether the Buddhists and the Ājivikas borrowed the idea from some tribal culture; even the latter might have influenced to a certain extent the social and cultural pattern of some of the Republics which rose to prominence during the time of Buddha and Bimbisāra.

It is evident, therefore, that secular concept of elliptical halls predated that of the shrine or *stūpa* having an identical plan. In fact, the Buddhists as well as the Brahmanical elliptical shrines were largely inspired by such communal building, the plan of which might have had some remote connection with the four-cornered burial mounds meant for the worshippers of

¹ A. Ghosh and H. Sarkar, 'Beginnings of Sculptural Art in South-east India: A Stele from Amaravati'. *Ancient India*, No. 20 (*in the press*)

² P. V. Kane, *History of Dharmasāstra* (Poona, 1953), Vol. IV, p. 247



LOMAS RISHI CAVE

FIG. 1

RAJGIR, DISTRICT PATNA, SKETCH PLAN-JIVAKAMRAVANA AREA

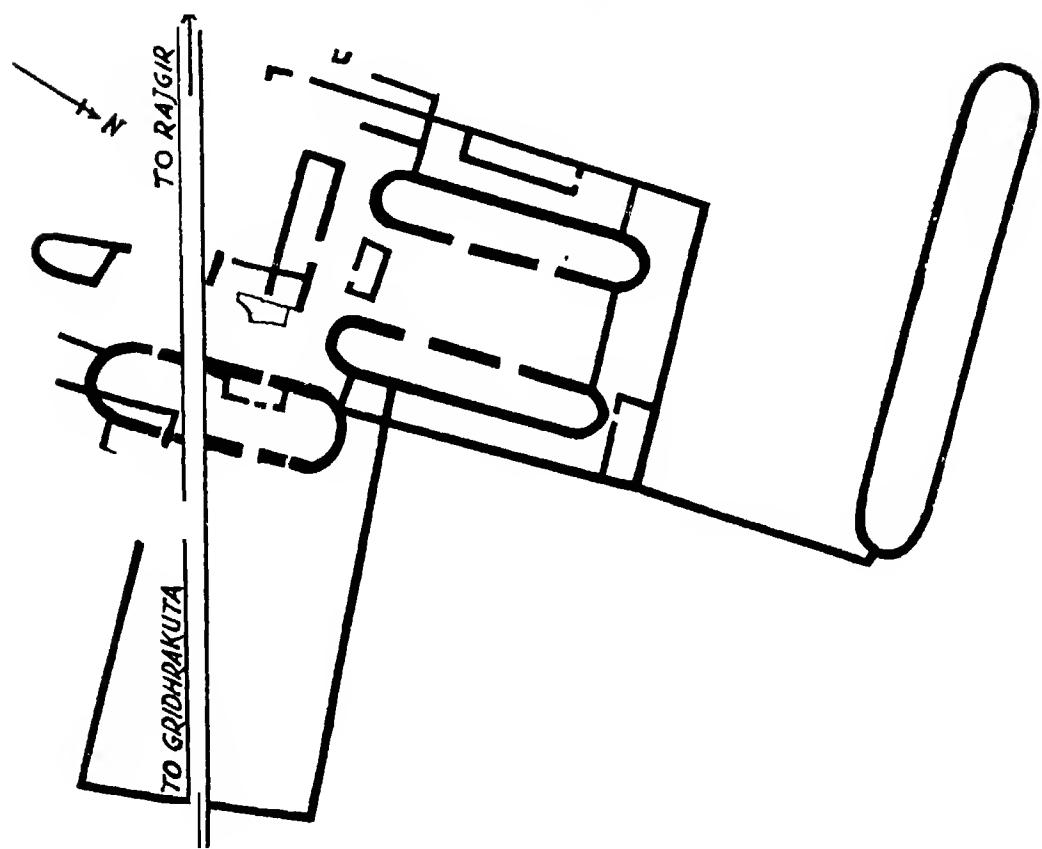
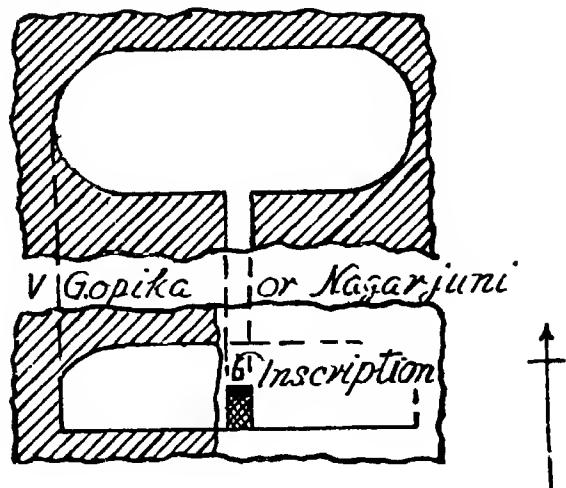


FIG. 2.

NAGARJUNI CAVES



1050 10 20 30 40 50 Feet.

FIG. 1.

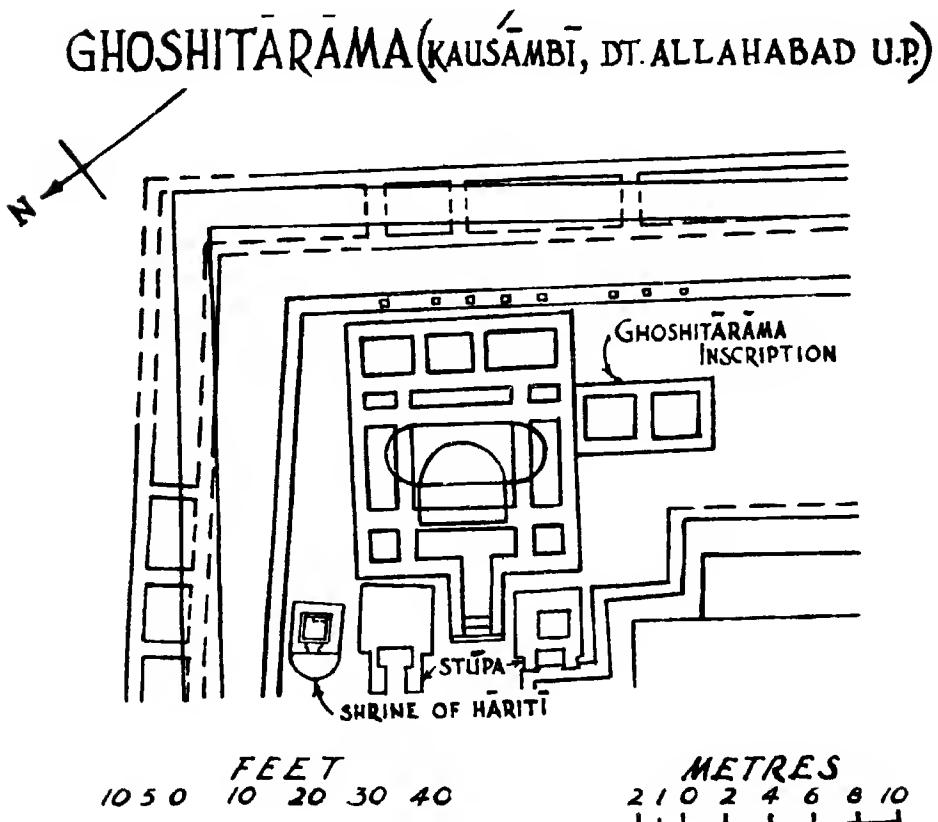
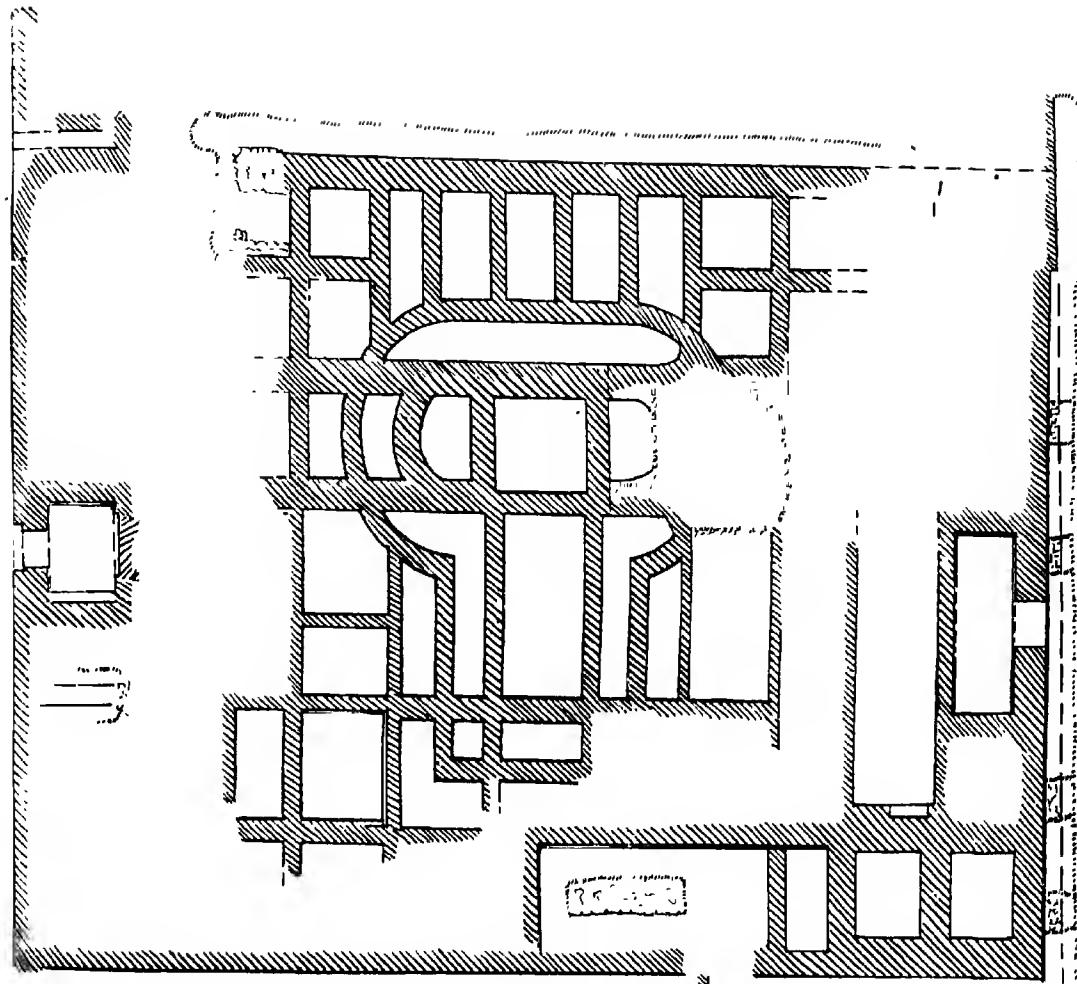


FIG. 2.



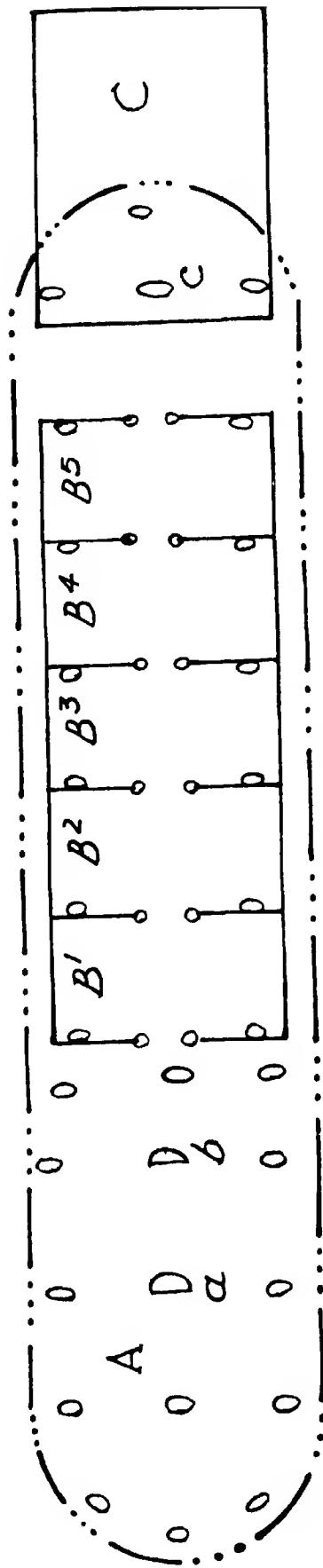
EXCAVATIONS AT SAHETH-MAHETH

PAKKI KUTI

FEET

10 5 0 10 20 30 40 50

A LHOTA MORUNG
SCALE: 1":10'



PLAN

A = Open verandah. B' to B⁵ = Sleeping cubicles.

C = Sitting-out platform. A = Outer carved post.
b = Inner carved post. C = Back carved post.

RARE AND UNIQUE ANTIQUITIES FROM RĀJGHĀT

By ADRISS BANERJI

The plateau of Rājghāt over which the Kāshī railway station was erected in the nineteenth century by the old Oudh and Rohilkhand Railway (since merged with the East Indian Railway in early twenties of this century), now a part of the Northern Railway, came into prominence in 1940, when the former East Indian Railway started regirding the bridge over the Gaṅgā, then known as Dufferin Bridge, now renamed Mālaviya Bridge. Its mass excavations for removal of debris to extend the station yard brought to light enormous quantities of antiquities, consisting of *disjecta membra*, two copperplates (one in a stone casket), sculptures, beads, clay figurines, seals and sealings, etc. Mr. W. W. Finlay, I.C.S., then District Magistrate and Collector, Benares, made me in charge of antiquities found by the railway authorities, under the Treasure Trove Act, when I had just joined Sarnath Museum as Custodian. But it was a hopeless task sitting at a distance of four miles from the place and depending on a Muslim monument attendant (*Chaukidār*), whom the unscrupulous curio dealers in league with the Hindu labourers cheated. A major portion of the spoils was salvaged by the skilfulness of Rai Kṛiṣṇa Dāsa, who has now made them over to the Hindu University. All objects in my custody, including the charter of Govindachandra, contained in a stone casket, since edited in *Epigraphia Indica* by Śrī Kṛiṣṇa Deva, were transferred to Bhārata Kalā Bhavana on permanent loan by the then Director-General of Archaeology, the late Raobahadur K. N. Dikshit. The credit of making the first attempt on scientific digging at Rājghāt goes to Sarvaśri S. Mukherjee and K. Deva, of the Archaeological Survey. The objects under discussion were found in this excavation.

The object of the paper is to discuss some sealings and one terracotta plaque. Seals found at Rājghāt have already been discussed by K. Deva, pointing out the occurrence of Gupta coin types and Hellenic divinities.¹ The former feature is shared by the seals and sealings found at Bhitā by the late Sir John Marshall.² Professor Pathak has also described some Rājghāt seals now in Bhārata Kalā Bhavan. These are generally religious sealings.³ Since time immemorial, seals have played a significant part in the developing economy of a community, and in its fiscal, commercial and banking organizations. Even pre-literate society could not afford to neglect them and used symbols for purposes of authentication. Literate society, with its growing industrial and commercial contacts, added legends to them in addition to the symbols. Thus the seals and sealings of Harappa culture, found not only in India but in other countries of Asia, testify to the talented commercial life of the people. Not only in State business, but in the life of an ordinary private citizen, their importance is undeniable. For sale and purchase of lands, transactions in agricultural commodities, cattle, horse, sheep, camels, metals, stone, textiles and ivory, etc., the importance of *anika* (seal) is undoubtedly. In affairs of the State—the alleged treaty between Seleukos and Chandragupta—Maurya must have borne royal seals. Messages to contemporary Hellenic rulers (*yonarāja*) for establishment of

¹ *Journal of the Numismatic Society of India*, Vol. III, pp. 73 ff.

² cf. writer's 'Coin Devices of Bhitā Seals'—*I.H.Q.*, Vol. XXIX, pp. 222.

³ *J.N.S.I.*, Vol. XIX, pp. 168–79; and Vol. XX, pp. 195–201.

charitable institutions referred to in Asokan edicts must have borne imperial seals. In Indian history, the importance of seals was first mooted by the late Dr. J. F. Fleet.¹ They had a value for the race, nation and collectivity. The instance of *Abhijñānasakuntalam* referring to the royal signet-ring is too well known. Every copperplate grant bore the State seals. Bānabhatta in his *Harṣacaritam* mentions golden seal of the Puṣpabhūti kings. The fifth act of *Mudrārākṣasa* narrates that Siddhārthaka's letter bore the impression of the seal of office of the Minister Rāksasa. The same work supplies us with the information that 'Identity Cards' duly sealed were needed to leave military encampments. According to *Mahābhāratam* when Dvārakā was invested, security measures were taken to scrutinize that no one left and entered the city without authenticated permits. (*Vana-parvan*, adhyāya 15, śloka 18). In this way literary references could be multiplied *ad infinitum*. When the Allahabad pillar inscription of Samudragupta states that many of the frontier States and monarchies gladly accepted the charter of their existence bearing the 'Garuda' seal, it supplies us with the term *anka* for seals.²

These seals and sealings are a valuable source of the cultural history of our country. They bring before our eyes the life and times—the social, political, religious, commercial, economic and fiscal condition. The terms used for administrative, revenue and military organizations. They supply a great deal of data about the iconoplasic art of ancient India. In the field of art, they present the evidence of a high skill reached in one of the most important branches of the plastic activity, the glyptic art, about whose origin, development and decay our researches are significantly absent.

SEALS AND SEALINGS

1. A sealing of black clay bearing a pear-shaped impression. Above a wheel within dotted border. Below legend in characters of c. fifth century A.D. *Sivadattasya* (R.J. 177).

2. Sealing of greyish clay bearing an oval impression. Above bow and arrow. Below legend *Harisimhasya*. At the bottom occur the following symbols: *Śrī Vatsa*, *svastika*, and another (R.J. 7717).

3. The seal of Harisenā. Bow above. At the centre tree within railing and the legend *Harisenasya*. The following symbols occur: *Nandipāda*, Triskelis, *svastika*, etc. (R.J. 558).

4. A sealing of grey clay. Bow and arrow above, in rectangular field. At the centre *Harisenasya* (R.J. 50).

5. Grey sealing with three pellets arranged in a triangle (R.J. 85).

6. Black sealing. Damaged. *Śrī Vatsa* in circular field (R.J. 131).

7. A grey sealing divided into two registers. In the upper part lingam (?) on a pedestal with battle-axe right and another two to the left. Field divided by double rows of diamonds. Below in characters of third century A.D. *Amachama* with the hill symbol consisting of three arches below (Pl. II, 7).

8. Sealing with circular impression showing a bull facing left. Below it a pyramid of three solid spheres or balls. On the right, grounded spear (*Sūchi?*). Legend in characters of first century B.C. *Dhanadevasya* (R.J. 271, 25 p.). There are several copies (Pl. II, 8).

The seal is neither that of Dhanadeva of Ayoḍhyā³ nor of Kauśambi,⁴

¹ *Imperial Gazetteer*, Vol. II, p. 29.

² *Corpus Inscriptionum Indicarum*, Vol. III.

³ C.O. in B.M., A.I., p. 133, Pl. XVI, 17.

⁴ *Ibid.*, p. 153, Pl. XX, 12.

though it has some analogy with them. These seals are now kept in the Central Antiquities Section, Archaeological Survey of India, New Delhi.

PLAQUE

The next object is a plaque almost like a copper-celt decorated on both sides. Front shows waters indicated by curves flanked on either side by fishes above them is the motif *par excellence* of iconoplasic art of India—the pot with foliage with one conch (*sankha*) on either side of the base. The pot is original. It has a pedestal base, with stars (?) or floral motifs in relief on its belly. It has a slender elongated neck with a wide mouth from which foliages issue. It is the pot of plenty and combines an abstract Vedic terminology with a concrete Indian concept of a symbol of abundance or fertility; because, its specific associations are with water and vegetation. Indeed, a definite iconoplasic type seems to have been evolved very early and has survived unchanged to our day. Researches of Drs. A. K. Coomaraswamy and J. N. Banerjea have made that abundantly clear. It has various names: *pūrnakalasa*, *mangalaghāṭa*, *bhadraghāṭa* (X.32.9), etc. *Rgveda* refers to *pūrnakalasa* (III.32.15) containing the waters of eternal life. It was known as *Somadhana* or a receptacle of Soma (VI.69.6; IX.97.33; IV.27.25), that life-giving ambrosia. Vedic Aryans thought, while the Soma-juice accumulated within the *kumbha*, it persuaded all kinds of beauty to stay in it (*R.V.*, IX.62.19). The earliest conception of association of *Somabhāṇḍa* and *Śrī*. The former stands as male while *Śrī* is the female—the later concept of *purusha* and *prakṛiti*.

The concept of the *mangala-*, or *pūrṇa-* or *bhadraghāṭas* is explicit. They were installed in the houses to propitiate the presiding divinity of homes known as *Śālā* (III.12.1-7; III.12.8), to bless the household with plenty and prosperity, sturdy youths, and beautiful maidens and plenty of cattle. The *Dhammapada* commentary (*Aṭṭhakathā*) has a similar picture (I.147). The cosmic conception of *pūrnaghāṭa*, with its firm substratum of time, is clarified also by the *Atharvaveda* (XIX.53.3). This Veda further elucidates the cosmic nature of human powers and of the physical, vital and psychic functioning of the body. The secret of the full vase symbol lies in its two-fold characters, namely life and growth (X.2.30; XI.8; VIII.19-27; XI.8.32-34). *Yajurveda* also refers to it (XIX.87).

These later Vedic conceptions we find transformed in stone, e.g. B.89 of Lucknow Museum.¹ The whole pillar consists of a tall growing lotus creeper rising from a vase, as in our plaque with two peacocks seated on the central leaf at the back; while in the front *Śrī* is standing on two *ghāṭas*. The association of *Śrī* with two full vases as her *pīṭha* has been found in earlier Barhut reliefs, too. At Sanchi, the full vase motif is associated with lotus motif, which covers the vase with its petals at the base, on the belly and on shoulders. Meandering lotus creeper gathers a rhythm at Amarāvati. On ivory plaques found at Begram the full vase has greater elaboration of foliage with a cloth of girdle over its belly. This decorative girdle also occurs at Amarāvati and Mathurā in India and Indonesia.

We have seen in the previous paragraph that the full vase became associated with *Lakshmi* or *Śrī*. The evidence of definite aniconic representation by symbolism is supplied by seals found at Basārh, Bhīṭā, etc. But at this stage complexities arise. The above discussion has shown that apart from occurring as a simple vase with foliage symbolizing life and growth it continued to acquire a complex character by its association with other

¹ A. K. Coomaraswamy, *History of Art in India and Indonesia*, p. 65, fig. 74.

symbols and being common to other sects and religions. Thus *sankha* is an *āyudha* of Viṣṇu, but it is also a *nidhi* of *padminī-vidyā*, whose presiding divinity again was Śrī or *Lakshmi*.¹ Śāṅkha and *pūrnaghāṭa*, again, are considered auspicious symbols by Jainas according to *Kalpasūtra*. The wheel is an *āyudha* of Viṣṇu-Nārāyaṇa. It symbolized the Buddhist *dharma*, a *ratna* of a *chakravarti* king and a *midi*, too. Fortunately for us, the diemakers of Gupta Vaiśālī have supplied data to trace the ultimate transformation of the prehistoric pot with foliage motif into symbol of fecundity and plenty. This is sealing No. 12 found by the late Dr. Theodore Bloch in 1903-04. This is a seal with circular field. Two thick lines divide it into two equal registers—its upper part shows a *kalasa* at the centre with foliage. On the proper right side we have the word Śrī, on the left a conch; its lower part has a legend: seal of the office of the commander enjoying the rank (and precedence) of the Crown Prince (*Yuvarāja-bhṛṭaraka-pādiya*).²

If the *pūrnaghāṭa* therefore was the visual symbol of Śrī, then what did she stand for and what were her scope and function? The cult of Śrī or *Lakshmi*, at the very commencement, was connected with the 'Great Mother Goddess'.³ In the early Vedic literature the word Śrī implied beauty. The Śrī-*sūkta* of *Rgveda* gives the full iconographic values of the ideology. She is not at first the consort of Viṣṇu,⁴ but indicated merely the physical beauty. In the later Vedic literature the conception of Śrī as beauty does not disappear but the idea of her important position in worldly affairs becomes prominent. In the *Śatapathabrahmāṇa* (XI.4.3.1) the abstract conception gives place to concrete form. Her association with *kalasa* (*snapitā-hemakumbhair*) with elephants (*gajendraḥ*) are abundantly made clear in Śrī-*sūkta*. As pointed out by the late Dr. A. K. Coomaraswamy, her association with Viṣṇu is first pointed out in *Taittiriya Saṁhitā* (VII.5.14). Here 'Śrī, the lady of the quarters, is mentioned as the lady of Viṣṇu'. In the epic and *paurāṇic* periods she is described as mother of Kāmadeva and becomes associated with Indra, the god of waters, and Kuvera, the god of wealth. She bore in her hand a *makara*. She has been described as *Padmālayā* or *Padmahastā*. But Pali tradition treats her ignobly—her fickleness being correctly emphasized. The iconography of Śrī in her five aspects (1) *Kamālālayā* or *Kamalahastā*, (2) *Gajalakṣmi* or *Abhiṣekalakṣmi*, (3) Śrī, with *yakshas* establishing her as the goddess of wealth, (4) Śrī with *makara* or *Ganeśa*, establishing her connection with Ganges water, and (5) Śrī, the goddess of overseas trade, have been dealt with by Drs. A. K. Coomaraswamy, J. N. Banerjea and Motichandra. The conch-shell symbolizes good luck, according to *Vishnudharmottara*, and also the sea.

If we now examine the plaque under discussion (Pl. III) we find that the pedestal pot with long neck is the *pūrnaghāṭa* or *maṅgalakalasa* from which the issuing foliages denote fertility. The stars on the belly possibly stand for the sky. The conches (*sankha*) are defined to stand for one of the *nidhis* of *Padminī-vidyā* by Dr. J. N. Banerjea according to *Mārkandeya-purāṇa*, whose presiding divinity was Śrī or *Lakshmi*. Waves represented by superimposed curves and a fish on either side establish her connection with the sea, made abundantly clear by several Basarh sealings, particularly

¹ J. N. Banerjea, *The Development of Hindu Iconography*, pp. 166 and 210.

² A.R.A.S.I., 1903-04, p. 108, No. 12; Pl. XL, fig. 5.

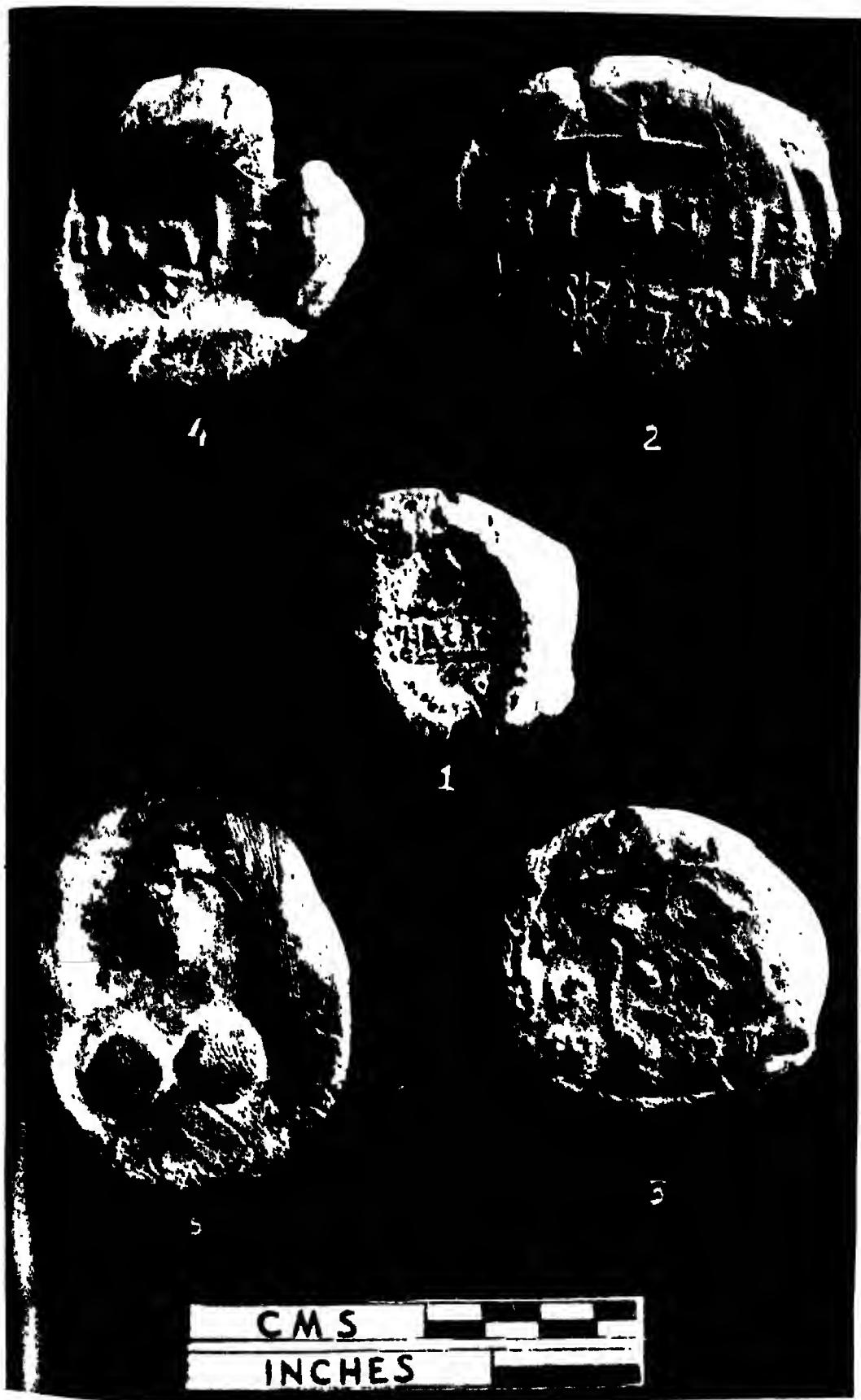
³ J. N. Banerjea, *op. cit.*, pp. 183 ff. Glotz, *Aegean Civilization*, p. 245.

⁴ H. Oldenberg in *Rupam*, Oct. 1927, pp. 98-121.

sealing No. 93 depicting a sea-faring vessel.¹ Dr. Motichandra has discussed it with great detail in his paper, 'Padma Sri', establishing her character as the presiding divinity of overseas trade.² It is clear, therefore, that the object is the symbolical representation of goddess *Sri*. As an object of art, an analysis of the style, conventionalization of its motifs, places it in c. A.D. 600-700. The pot also is singular in design. It may be argued that being potter's work the weaknesses in composition may be due to the individual potter and cannot be taken as evidences for a late date. But the treatment of the foliage leaves little doubt about its age.

¹ *A.R.A.S.I.*, 1913-14, pp. 129-30, Pl. XLVI.

² *Nehru Birthday Book*, pp. 497-513.



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Five sealings from Rājghāṭ (Vārāṇasī) : now in the Central Antiquities Section, New Delhi

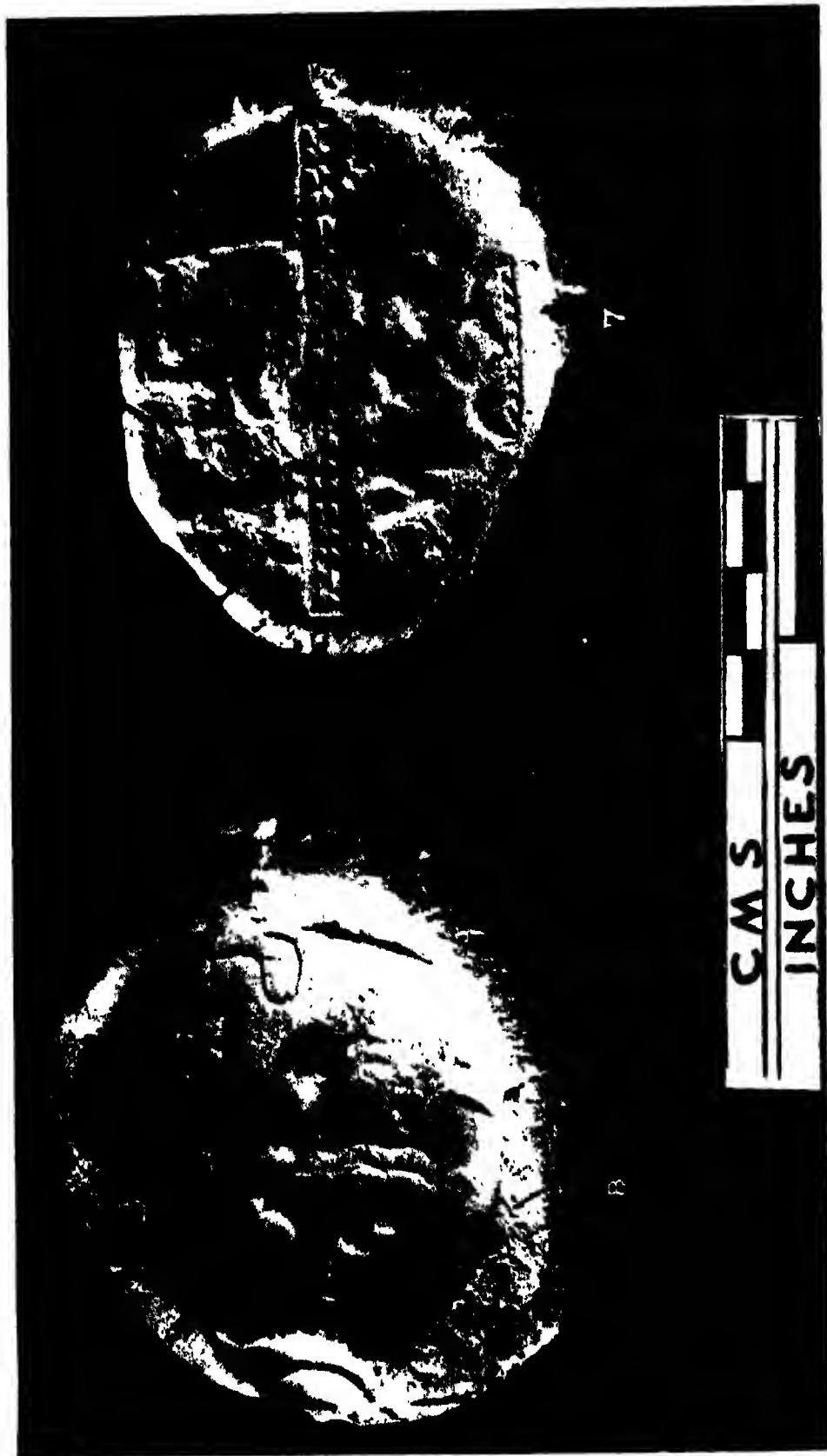
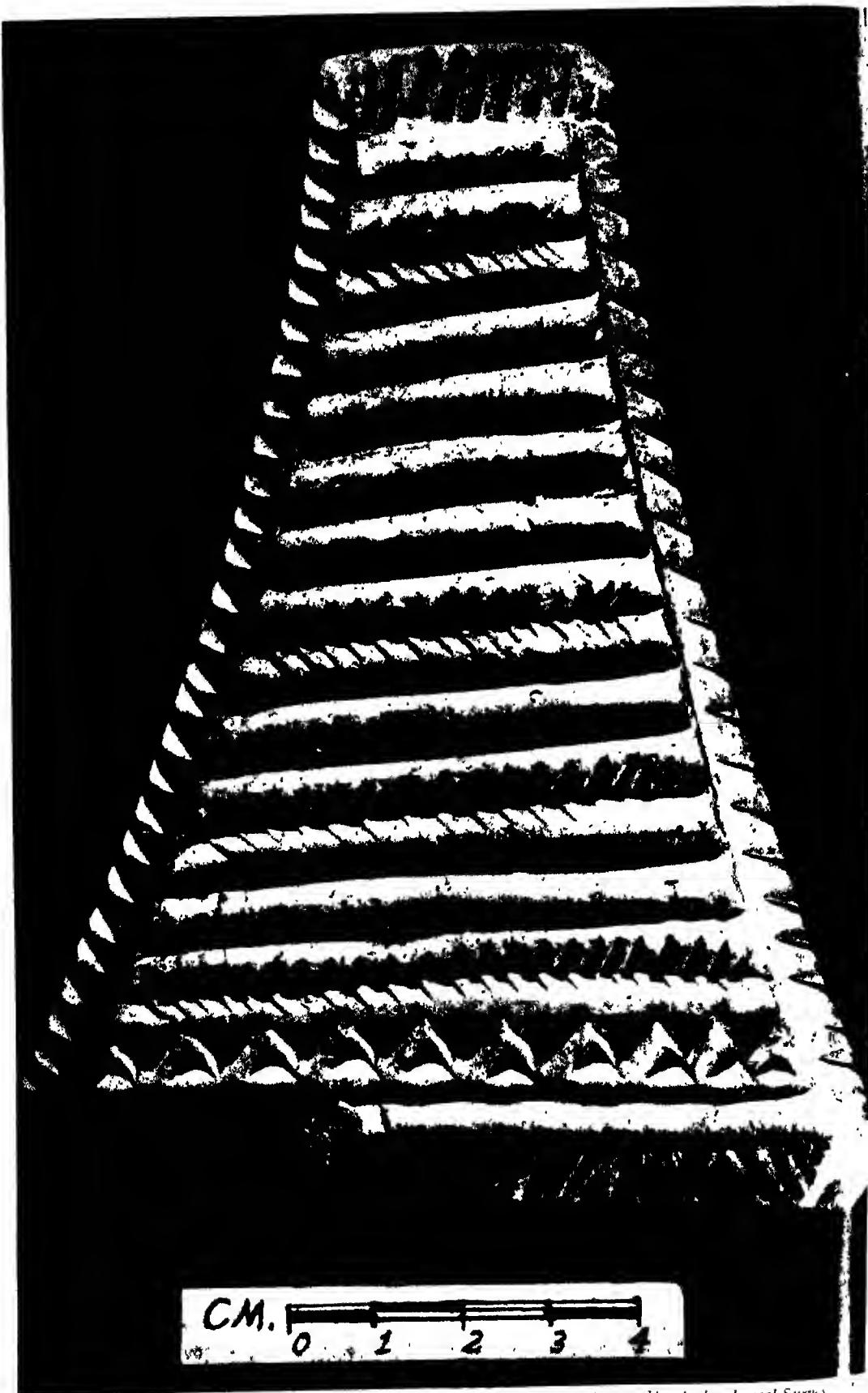


Fig. - aling, from Rājgṛhāt (Vārānasi). Enlarged twice Now in the Central Antiquities Section, New Delhi.
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ut view of the terracotta plaque from Rājghāt (Vārāṇasī), depicting pot with foliage motif,
fishes and conch, etc. Now in the Central Antiquities Section, New Delhi



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Back view of the terracotta plaque from Rajghat (Vārānasi) Now in the Central Anti
Section, New Delhi.

AMBĀ-NANA-DURGĀ

By BANDANA SARASWATI

A unique gold medal (assignable to the first century B.C. on palaeographic grounds) in the British Museum¹ (Fig. 1), London, shows on one side the figure of a humped bull with the Greek legend *Tauros* above and the Prakrit legend in Kharoshthī *ushabhe* (Sanskrit *vrishabha*) below. Both the legends mean 'bull'. On the other side appears the figure of a goddess, fully robed and crowned by a three-pronged head-dress, with her left hand resting on hip and right holding a flower (lotus bud). There is a Prakrit legend in Kharoshthī on either side of the goddess. The portion to her left has been read as *Pakhalavadi-devata* (*Pakhalāvadī-devatā*), meaning the deity of Pakhalāvati (Pushkalāvati, modern Charsada in the Peshawar district). Recently Dr. B. N. Mukherjee has read the portion of the legend to the right of the goddess as *ampae*.² *Ampa* is the Prakrit form of *Ambe* or *Ambā*, *ampae* being its genitive form. The entire legend would thus read *Pakhalāvadi-devatā Ampae* meaning 'Of Ampa, the deity of Pakhalāvadi'. The deity of Pakhalāvadi has been designated in the legend as *Ampa*, i.e. *Ambe* or *Ambā*.

A goddess, iconographically corresponding to the deity of Pakhalāvadi, appears on some copper coins of the Indo-Scythian king Azes (Fig. 2). On the obverse of these coins we have the figure of the goddess with the Greek legend *Basileos Basileon Megalou Azou* and on the reverse the humped bull with the Prakrit legend *Maharajasa rajatirajusa mahatasa Ayasa* written in Kharoshthī.³ Though we miss here the distinctive designations of the devices, as on the above gold medal, there can hardly be any doubt that the goddess presented here is the same as the one designated as *Ambā*, the deity of Pakhalāvadi, there. On both she appears in association with the bull.⁴ On some coins of similar type in the British Museum (Fig. 3) there appears the forepart of a lion beside the goddess.⁵ This is certainly a new addition in her iconographic repertoire.

Ambā means 'mother' and the mother aspect is emphasized in the concept of the great goddess Durgā of the Hindu pantheon by such of her many names as *Ambā*, *Ambikā*, etc. In mythology she is the consort of Śiva, whose distinctive mount is the bull. In this context it is useful to note the following observation of Coomaraswamy:⁶ 'In Buddhist art we find at Bharhut and Sanchi the tree, wheel, etc., on or behind an altar, clearly designated in inscriptions as Buddha (*Bhagavato*) and worshipped as such... Later on the figure of a human teacher takes its place upon the throne, the old symbols being retained as specific designations... In the same way with Hindu types: thus we find at first the humped bull alone, then a two-armed and finally a four-armed figure accompanying the bull, once the representative of the deity, now his vehicle, while other symbols are held in the hands as attributes.' In the light of the above observation

¹ *BMC.*, p. 162.

² *Num. Chron.*, 1965, pp. 110 f.

³ *PMU.*, I, p. 129, Pl. XII, 308.

⁴ Dr. B. N. Mukherjee would like to describe these as the characteristic devices of Pushkalāvati mint.

⁵ *BMC.*, p. 85, Pl. IX, 5.

⁶ *HIA.*, p. 45.

there seems to be little doubt, as Professor J. N. Banerjea has suggested,¹ that the bull on such pieces stands for Śiva. The goddess represented on these pieces has usually been identified with Śrī or Lakshmi.² In association with Śiva in his animal form (bull) there is every possibility that the goddess is to be identified with his consort in one or other of her aspects.³ The name Ambā given to the goddess on the gold medal fully corroborates this. The lotus in one of the hands of the goddess need not stand in the way of this identification as lotus is included in the texts as one of the emblems or attributes of Durgā and a few of her aspects (cf. *dakshinē chotpalam hasta vāmahastam prasārayet* in the *Āgama* texts in respect of the description of images of Gaurī, a form of Durgā; *kaṭisamsthitavāmakarā sarojamitarena chodvahatī* in *Brihat Śāṅkhītā*, lvii, 37, in regard to the description of images of Ekānamśā, an aspect of the great goddess). It is exactly in this latter attitude that the goddess on the above pieces has been represented.

Another aspect of Durgā is also found represented on a few gold coins⁴ of the Kushāṇa ruler Huvishka under the name of Ommo, i.e. Umā, which is one of the many names of the great goddess. Again, Rapson has noticed on a quarter stater of Huvishka in the British Museum (formerly in Cunningham's collection) in which Ommo (Umā) appears in the company of Oesho (Bhaveśa = Śiva). In the Pakhalāvadi medal and coins of Azes we have one manner of showing the god (in his animal form) on one side and his consort (in her anthropomorphic form) on the other. In the coin of Huvishka, just described, we have another manner of representing them together, both in their anthropomorphic forms, on the same side.

The great goddess Durgā is distinguished by the lion as her mount. The goddess of Pakhalāvadi on the gold medal and on certain copper coins of Azes and Umā on a few coins of Huvishka are among the earliest anthropomorphic representations of some of the aspects of the great goddess. It is interesting to observe that except on a very few coins of Azes the association of the goddess with the lion has not been indicated. Few coins show this association in a rather hesitating manner by representing only the forepart of a lion beside the figure of the goddess. The emergence of this distinctive feature of the goddess seems to offer an interesting problem in the study of her iconography.

A few gold coins of Huvishka may appear to offer a clue to a satisfactory explanation of this problem. One of them is preserved in the Punjab Museum,⁵ Lahore, and another, formerly in Cunningham's collection, is now in the British Museum.⁶ On the reverse of each we find two figures, a god and a goddess, standing facing each other, and designated respectively as Oesho (Bhaveśa = Śiva) and Nana in the Punjab Museum specimen, and as Oesho and Ommo (Umā) in the British Museum piece. In one of the hands of Umā on the latter a flower (possibly lotus) is clearly recognizable. The characteristic emblem or weapon of Nana is a short sceptre, as we have in her many representations on Kushāṇa coins.

Nanaia (Anahita), it should be noted, was a great Elamite goddess enjoying a very wide popularity over vast regions of Western Asia. Her association with the lion is clear and explicit. Herodotus⁷ gives a

DHI (2nd ed.), p. 113.

Eastern Art, I, pp. 175 f; PMC., I, p. 129.

DHI (2nd ed.), pp. 111, 135.

JRAS., 1897, p. 324; DHI (2nd ed.), pp. 126-27.

PMC., I, p. 197, No. 135.

JRAS., 1897, p. 324.

G. Rawlinson, *History of Herodotus*, Vol. II, p. 157.

description of the cult of the goddess and mentions the regions in which the cult was practised. Strabo¹ refers to the temple of the goddess in the precincts of which lions are said to have roamed about freely. Some coins from the North-West (Figs. 4 and 5), apparently of Yue-chih origin, bear each on one side the figure of a lion with the legend *Nanna* (*Nanaia*),² thereby indicating that the lion on such coins was meant to stand for the goddess. She is frequently represented on Kushāṇa coins.³ Though on most of these coins her association with the lion is not indicated, she is represented as seated on a lion on a rare gold coin of Kanishka (III)⁴ (Fig. 6). The identification is beyond doubt, as her name appears by her side inscribed in debased Greek characters.

The Kushāṇa rulers have been the most eclectic in the choice of divinities from various sources for the reverse devices of their coins. Among the Indian divinities the most frequently represented is the god Śiva and among the extraneous ones the goddess Nana (*Nanaia*). There are reasons to believe that a few Kushāṇa rulers specially adored these two divinities. The epithet *mahiśvara*, applied to Vima Kadphises (Kadphises II) in the reverse legend of many of his gold and copper coins bearing the figure of Śiva with his distinctive iconographic traits, has been interpreted by some scholars as suggestive of his devotion to Maheśvara⁵ which is one of the many names of this great god. On two coins of Huvishka, noticed by Cunningham, is shown the figure of the king kneeling before the goddess Nana.⁶

The popularity of the Indian god Śiva and the West Asiatic goddess Nana (*Nanaia*) thus seems to have been established among the Kushāṇa rulers, and there was every possibility of the West Asiatic goddess being identified with the consort of the Indian great god. That this actually happened is known from two coins of Huvishka, one showing Oesho (*Bhaveśa* = Śiva) with Nana and the other Oesho with Ommo (*Umā*). The lion distinctive of Nana (*Nanaia*) may thus have been appropriated by the great goddess Durgā, the consort of Śiva, as her mount. The process of identification seems to have been on the way before the Kushāṇas, as indicated by the appearance of the forepart of a lion in association with Ambā, an aspect of Durgā, on a few coins of Azes.

The above suggestion appears to be borne out by a particular reverse device on certain types of Imperial Gupta coins. The motif of the goddess Nana seated on a lion, as represented on the coin of Kanishka (III), reappears almost in identical form on Chandragupta-Kumāradevi coins, Lion-slayer type of Chandragupta II and Lion-slayer type of Kumāragupta I.⁷ On the coin of Kanishka (III) the goddess has a long staff with three globules on top (mace?) in the left hand and a fillet or noose in the right. On Chandragupta-Kumāradevi coins she usually has a cornucopiae in the left hand and a noose in the right. Cornucopiae is the particular emblem of Ardochso on Kushāṇa coins. It may be noticed also that in one of the coins of Huvishka showing Ommo (*Umā*), noticed above, Umā has a cornucopiae in one of her hands, perhaps a borrowing from Ardochso. On Lion-slayer types of Chandragupta II and Kumāragupta I the cornucopiae is replaced by a lotus with a long stalk, thereby leading to a complete

¹ H. L. Jones (editor), *The Geography of Strabo*, Vol. VII, p. 177.

² BMC, Pl. XXIV, 15.

³ Ibid., Pl. XXVI, 10; XXVIII, 5; etc.

⁴ JASB, NS., 1931-33, p. 7.

⁵ DHI (2nd ed.), p. 243.

⁶ PMO., I, p. 207; Num. Chron., 1892, pp. 117-18.

⁷ CCGDBM., Pl. VIII, 14; XIV, 6; etc. CGGCBH., pp. 1 f, 192 f, 283 f.

Indianization of the motif. From the occurrence of cornucopiae, lotus flower and lion mount the goddess has been described as *Lakshmi-Ambikā*—a composite icon combining the concepts of *Sri* or *Lakshmi*, the goddess of prosperity, and *Ambikā*, the mother aspect of *Durgā*. We have already noted that the lotus need not stand in the way of identification of the goddess with one or other aspect of *Durgā*. With regard to noose (*pāśa*) it may be stated that in the texts it is included among the varied weapons of *Durgā*. Instead of being a composite icon the motif now represents, in all probability, one single divine concept, that of *Durgā* herself in one or other of her aspects. Altekar describes the device on *Chandragupta-Kumāradevi* coins as representing *Ambikā* (?),¹ that on Lion-slayer type of *Chandragupta II* as *Ambikā-Lakshmi*² and that on Lion-slayer type of *Kumāragupta I* simply as the goddess.³ In the Introduction to his *Catalogue* he describes the device under the general appellation of *Simha-vāhini Durgā*.⁴ As the texts unanimously describe the lion as the distinctive mount of the goddess *Durgā* this seems to be the correct appellation. Such texts cannot usually be dated before the Gupta period. It is also interesting to observe that the few sculptural representations of *Durgā*, that have been noticed up till now, including those of the Gupta and post-Gupta periods, do not present the goddess with the lion mount. Apparently this iconographic feature took some time to become the established practice. This may support further the suggestion, made above, that the lion mount, a distinctive iconographic trait of the goddess *Durgā*, may have been borrowed from the concept of the Elamite goddess *Nanaia* through an interesting process of identification of *Nanaia* with *Śiva's* consort *Durgā*. The medal and the coins, described above, bear significant testimonies to the process of absorption of an extraneous concept by the Indian.

Abbreviations used :

BMC.—P. Gardner, *Coin of the Greek and Scythic Kings of Bactria and India*. British Museum Catalogue. London, 1886.

OCGDBM.—J. Allan, *Catalogue of Coins of the Gupta Dynasties and of Sasanka, King of Gauda*. British Museum Catalogue. London, 1936.

OGGCBH.—A. S. Altekar, *Catalogue of the Gupta Gold Coins in the Bayana Hoard*. Bombay, 1954.

DHI.—J. N. Banerjea, *Development of Hindu Iconography* (2nd ed.). Calcutta. 1958.

HIIA.—A. K. Coomaraswamy, *History of Indian and Indonesian Art*. London, 1927.

JASB, NS.—*Journal of the Asiatic Society of Bengal: Numismatic Supplement*. Calcutta.

JRAS.—*Journal of the Royal Asiatic Society of Great Britain and Ireland*. London.

Num. Chron..—*Numismatic Chronicle*. London.

PMO.—R. B. Whitehead, *Catalogue of Coins in the Punjab Museum, Lahore*. Oxford, 1914.

¹ *OGGCBH*, p. 1.

² *Ibid.*, p. 192.

³ *Ibid.*, p. 282.

⁴ *Ibid.*, p. xliv.



FIG. 1.



FIG. 2.

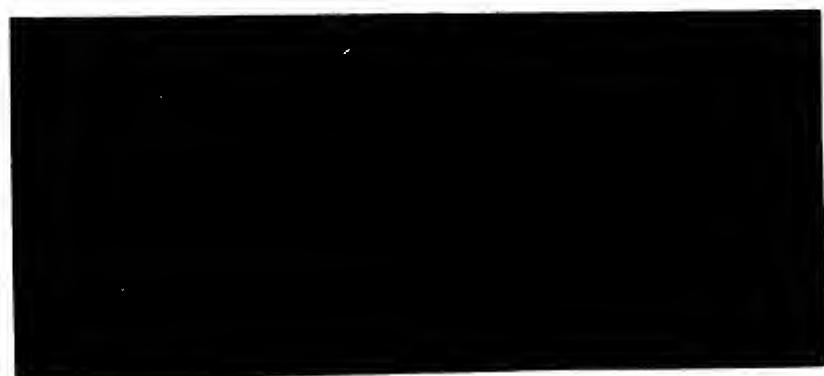


FIG. 3.

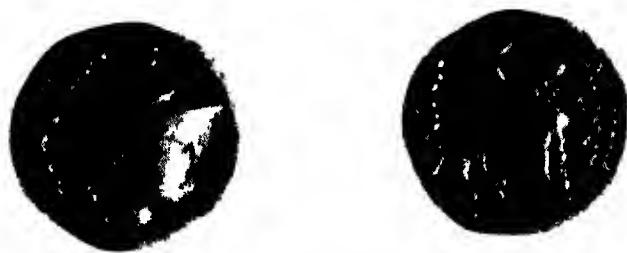


FIG. 4



FIG. 5.

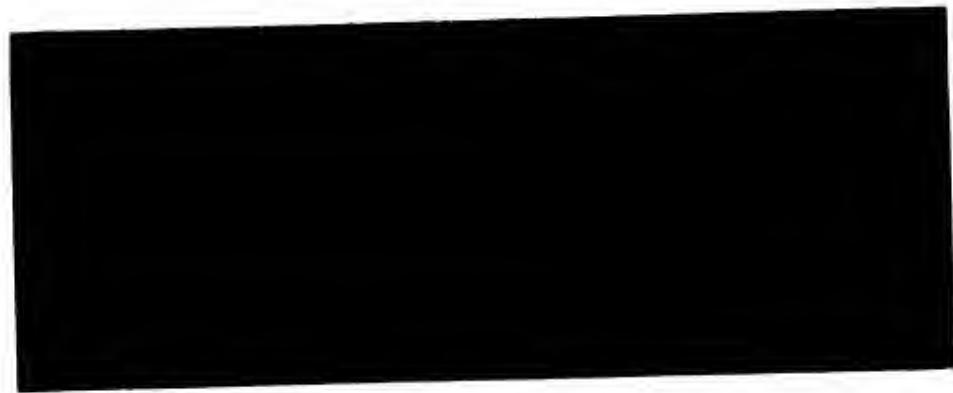


FIG. 6.

MONUMENTS OF BIJOLYĀ

By ADRISS BANERJI

Mewar has topographical features peculiar to itself, by which it was able to maintain its political and cultural entity for centuries and lead Indian resistance movement, successfully, against Turkish onslaughts. The northern and eastern portions of the state generally consist of an elevated plateau of open undulating country; while the southern and western portions are covered with hills and jungles. The area on the south-west, generally known as 'Hill tracts of Mewar', at once rugged and inaccessible, is the wildest portion of Aravalli hills. In the wider sense the 'Pāthār' is in reality the southern extension of Aravalli system. For miles and miles it forms an impenetrable massif, except at places like Bundi, Ranthambhor, Mukundārrā and Hathivāda near Ranakpur where roads ran through the tortuous passes. Commencing from Mahānāla (mod. Menal) where it tumultuously meets the plains of Malwa, with a break made by the Banas, before it falls into Chambal, it extends towards Karauli and Khushalgarh. In a shorter sense, 'Pāthār' is its southern extremity, where it has branched to the south-east and east towards Bijolyā, Menāl, Ratangarh and Bhainsror. Here it converts itself into a huge, wide, rolling tableland which is only precipitous on one side. Unless one visits the area personally, one cannot imagine the difficulties of terrain, that offered refuge to people, whom neither money and honour could purchase nor swords and spears did frighten.

The town has been variously named. Harabilas Sarda mentions it as 'Bijolian'. The late G. H. Ojha calls it 'Bijolyā'. Kielhorn spells it 'Bijoli' and D. R. Bhandarkar calls it 'Bijolia' probably the *vulgo.* of 'Bijolyā'. The fortified town of 'Bijolyā' is located in an elevated tableland in the midst of what was known as Uparmal hill range of the Aravallis. It is (25° 10' N. and 75° 20' E.) 50 miles from Chitorgarh, 35 miles south and south-west of Bundi and 112 miles NE. of Udaipura city, in the present Bhilwara district of Rajasthan. I visited the place from Bundi.¹ Tod mentioned its ancient names as 'Vijayavalli', 'Morakuri' and 'Āhichpur'. But the late D. R. Bhandarkar correctly pointed out that there is no evidence in support of these claims. According to one of the rock inscriptions found at the place, 'Vindhyaavalli' seems to have been the name in medieval times. It is quite possible that Vindhyaavalli was misread as 'Vijayavalli' by Col. Tod's assistant. Morakuri is certainly not the name of the place, but that of a hamlet in the neighbourhood, granted to the temple of Pārvatī.²

The area has been inhabited since the Stone Age. Old Stone Age artefacts have been picked up in the bed of the Gambhira River. At Chamli near Badoli, the cliff showed 'an implementiferous deposit of conglomerate and a deposit of loose gravel overlying the gneissic bench'. Old Stone Age industries of the region divide themselves into two classes—pebble tools and handaxes. Sonita yielded choppers, cleavers, one ovate and flakes of so-called Clactonian technique. At Bhainsrorgarh two implement-bearing

¹ H. B. Sarda in *Journal of the Royal Asiatic Society*, 1913, p. 264, p. 1 and p. 265; G. H. Ojha, *Udayapur Rājya-kā-Itihāsa*, Vol. I, pp. 58 ff.

² *Progress Report of the Archaeological Survey of Western India*. For the year ending 30th June, 1905, p. 57.

deposits were noticed, on the left bank of the Chambal at Navghat, and of Bamini, a tributary of the Chambal. The yields were one chopper, seven handaxes, five cleavers, nine scrapers, etc. Exploration of Dr. K. N. Puri in portions of Udaipur and Chitorgarh districts in the valleys of Ahar-Berach-Gambhiri, Banas, Chambal and Wagan rivers resulted in the find of sites bearing so-called palaeoliths, microliths, etc. This area again has supplied sites containing proto-historic pottery at Siālpura, Fachar, Tarawat and Joera in Udaipur district and at Undala, Viroli, Hironji-ka-Khera and Khor in Chitorgarh¹ district. Tools of Series III, or microliths, unassociated with pottery were found at Tarra, Bamini and Kalikunya near Bhainsrorgarh, etc. The subsequent history of Rajasthan is too well known to require any recapitulation.

To retrace our steps, the foundation of the city used to be ascribed in the nineteenth century to one Rājā Hūṇa—a tradition which it shares in common with Bādoli or Bhadrāvati, Menāl or Mahānāla and Bhainsrorgarh. In Carlyle's time, they were recognized as rulers of the area between Kota (district), Bhainsrorgarh, Bundi (that is whole of Hādāvati), Mahānāla and Bassi. That is the most inaccessible portion of Mewar hill tracts, which they continued to rule, according to folk tradition, till the advent of the Chāhamānas and Guhilots. What reliance can be placed on this tradition, unsupported by any other form of evidence, is a moot point. Already in the time of A. C. L. Carlyle, the annalists and dynasts were converting Hūṇas into *Auna*. But the fact remains that Hūṇas survived long in Indian society bereft of their rapacity and vandalism, and they were generally connected with Śaiva temples in Rajasthan.²

JAIN MONUMENTS

About a mile to the south-east of the walled town stands a Jain temple on a rocky ground. In front of the fane are two small pillars inscribed on four faces. Carlyle, under a misapprehension, called them *sati* pillars. In reality, they are *Nishedhikās* and contain the order of succession of Jain pontiffs. At a little distance, but in front of the temple, are the ruins of a columnar hall, regarded as the ruins of a palace by the local people and called 'No-Choki'. To the north of the temple is a reservoir known as Revatikunda. Between the *Kunda* and the enclosure, again to the north of the Jain temple, is a rock inscription (11' 6" × 3' 6") whose contents will be discussed in a subsequent section. There is a second inscription (15' × 5') near it. It records that the temple of Pārvanātha was repaired by a merchant named Loliga in the reign of Chāhamāna Somesvara II (c. A.D. 1170-79) and surrounded it by seven smaller temples, which are not traceable now.

BRAHMINICAL SHRINES

To the east of the city near the ramparts stands three Brahminical fanes noticed by A. C. L. Carlyle.³ These are temples of Hājāresvara or Sahasralinga, Mahākāla and Baidyanatha (*vulgo*, Baijnath) and Uñdesvara-Mahādeva. Close to these is the second reservoir named Mandākini Kundā. The upper portion of the walls of this *kundā* contains many pilgrims' records throwing valuable light on the history of these edifices.

¹ *Indian Archaeology—A Review*, 1953-54, p. 37; 1954-55, p. 58; 1955-56, p. 68; 1956-57, pp. 5-9, Plate I, etc.

² For detailed discussion see *Journal of Asiatic Society*, Vol. IV, No. 1, for my paper, 'Hūṇas in Mewar'.

³ Cunningham, *Archaeological Survey Report*, Vol. V, p. 243.

EPIGRAPHS

The most important epigraph is a Jain record edited by Kavirāja Śyāmala Dāsa, almost a century ago. It has now been re-edited by Pt. A. K. Vyasa.¹ Its object was to record the erection of the temple of Pārśvanātha, the 23rd Jain *tirthankara*, by a pious digamvara named Lolāka. It mentions all the Chāhamāna Kings from Sāmanta to Someśvara II. It would be recalled that this king (Someśvara) succeeded his nephew, Prīthvirāja II, and was a grandson of Chaulukya Jayasimha-Siddharāja (c. A.D. 1094–1144). He ruled possibly from c. A.D. 1170–1179.² It further states that a Porvad *Mahājana*, named Loliga, repaired the temple of Pārśvanātha and surrounded it with many subsidiary shrines. The second record is a Jain *kāvya* called *Uttama Śikhara Purāṇa* by Siddhasūri. The two *nishedhikās* record the names of digamvara Jain pontiffs of Śrī *Mahā Samgha*, Sarasvati gachchha, *Balātkara gāṇa* and Śrī *Mūla Samgha*, in the line of āchāryā Kundakunda. The first inscription is dated in *Phālguna sudi* 3 gurau in 1483 V.S. (= A.D. 1426–27). It is the *nishedhikā* of Jain nun named Bai Āgamasiri. The second is dated in *Phālguna sudi* 2 Budhe in 1465 V.S. (= A.D. 1408–09) and states that it was the *nishedhikā* of Hemakirtti, pupil of Śubhachandra. The term *nishedhikā* needs some clarification. It has variants, such as *nishidhi*, *nishidhi* and *nishidhigē*. It was first met in a stone inscription, standing in the courtyard of the Meguti temple at Aihole, which mentions the identical *gāṇa* and teacher of Bijolyā record.³ According to the late Prof. K. B. Pathak in *Upasāgara Kevaligala Kathā* the term means a ‘tomb erected over the cremated remains of a Jain ascetic’.⁴ In another epigraph, occurring on a stone inside the temple of Hanuman in the village of Kadakol, noticed by Fleet, *nishidhi* is described as a pillar (*stambham*). To the present writer, it appears to be a pillar sort of object, originally of wood or stone, which was erected on the spot, where a Jain ascetic was cremated. The practice might have been developed from megalithic menhirs. Throughout Ranchi district, the majority of Mundas have been converted to Christianity and nowadays the menhirs or dolmens erected by them bear dates in the Christian era, or quotations from the Bible.

Amongst the inscriptions found at Mandākini Kunda, one is very interesting.⁵ It states that to bathe in this *kunda* was equivalent to offering *pindas* at Gaya (No. 2145). Since the characters belong to the c. fourteenth century A.D. when Gaya was under the Turco-Afghans, its justification is obvious. There are two other *ex-voto* records which commemorate a visit paid by Mathura *kāyasthas* to Mahākāla. Another epigraph dated in *Pausha vadi* 5 Some in 1386 V.S. (= c. A.D. 1329–30) records the visit of a *Naigama* (*Nigama*) *kāyastha*. These votive inscriptions range in dates from 1226 V.S. to 1556 V.S. (= A.D. 1169 to A.D. 1499), showing that it was famous as a place of pilgrimage till the fifteenth century A.D., if not later. *Pari passu*, the votive records of Mandākini Kunda throw sidelights on ceremonies prevalent in medieval Mewar. One of these is *Mahākālayātrā*, which the Mathura *kāyasthas* attended in A.D. 1386. The name ‘Achyāmādhaja jogi ([sic] yogī)’ occurring in one of the inscriptions (No. 2157) is indeed intriguing. His name is found in an inscription at

¹ *Journal of Asiatic Society of Bengal*, 1886, Vol. XL, pt. i, pp. 14–15, 28–32, 40 and 46; *Ep. Ind.*, Vol. XXVI, pp. 84 ff.

² H. C. Ray, *Dynastic History of Northern India*, Vol. II, pp. 1080 ff.

³ *Ind. Antq.*, Vol. VIII, pp. 245–46.

⁴ *Ind. Antq.*, Vol. XII, pp. 99 ff.

⁵ *Progress Report of the Archaeological Survey of Western India*, 1905, p. 58.

Tilasama (No. 2167) along with Jagam Raula, etc. Tilasama is a hamlet, six miles to the east of Jadoli, which itself lies at a distance of seven miles south of Bijolyā. His name also occurs on two inscriptions at Menālgarh on Mahānāla (Nos. 2178 and 2188), at Mukundārrā (No. 2103), at Deroli (No. 2177), a village two miles north of Tilasama, suggesting that this ascetic was visiting various Śaiva holy places in Mewar.

UNDEŚVARA-MAHĀDEVA

This temple (Pl. I, fig. 1) has been so named because the floor of the *garbhagriha* is at a lower level (*unda*) than that of the *mandapa*.¹ It consists of a *samvritta mandapa* with three *arddha-mandapas* on sides, with a pavilion surmounting each. The *mandapa* has a pyramidal roof (added at a later date). Otherwise it has a *vrutta-samsthāna* (star-shaped ground plan), giving access to an *antarāla* and finally the *garbhagriha*. The temple has a *pitha* and a *bhitta*. The two lowest rows are plain *kumuda*-mouldings with a dentil decoration below. The third row has *grāsa-pati* motifs. The next is an *antarapatra* of fighting elephants in relief. The topmost panel consists of a lozenge-shaped floral ornament in rectangular panels. Above them is a series of sculptures within *kūṭas*. The hypostyle ceiling of the *mandapa* is supported by squat ornate pillars of traditional style. Above the *danda chādyā* there is another frieze of vegetal motifs, *chaitya*-windows interspersed with sculptures.

The richly-carved door of the *sanctum* (Pl. II, fig. 2) has the figure of Lakuliśa on the *lalāṭa-bimba*. He is seated in *dhyāna* and holds the club entwined by snake in one of his hands. The antepagments are of *pañcha-sākhā* type, consisting of a *patra-sākhā*, *gandharva-sākhā*, *khalva-sākhā*, *rūpa-stambha*, etc. Above the doorway the *uttarāṅga* has the image of Natarāja at the centre, Śiva to his immediate right, Durgā to his immediate left and Vishṇu and Brahmā at either end.

The *śikhara* of the temple is of Paramāra or *Hemādpanthi* type (Pl. I, fig. 1). The texts like *Samārāṅgana-sūtradhāra* call them *bhūmija*, due to their peculiarity of grouping the *śikharikās* in groups or *bhūmis*. This type of *śikharas* has four large slabs of stones on *bhadras*, rising from the *varandikā* called *latās* covered with a network (*jālaka*) of *chaityas* and the spaces between them are occupied by groups of small *śikharikās* on pilasters (*kūṭastambhas*). In the present instance, each group of five has nine storeys, therefore *navamālikā*. In reality it is merely a variety of the *nāgara* style, having a parabolic curve. At the base of each of the *latās*, that is the top of the *jaṅghā*, we have conventionalized *chaitya*-window, with a *kīrttimukha* on the top. Inside the *gavāksha* is a divine image.

SAHASRALIṄGA TEMPLE

The temple of Hājareśvara or Sahasralinga is of *Lāṭa* or Gujarat type cluster of *śikharas* (Pl. III, fig. 3). At present it consists of a modern *mandapa*, erected with ancient *disjecta* and a *garbhagriha*. Above the *jaṅghā*, we have the *rathikā gavāksha* and on the *śukanāsā* the lion. The *lalāṭabimba* on the sanctum doorway has the figure of Lakuliśa. The *uttarāṅga* has on the right side, Śiva, Brahmā, a four-handed figure holding a standard, cocoanut shell, an indistinct object, while the fourth hand is in *varadāmudrā*.

¹ Possibly, like southern *arddha-mandapa* (chapel) of the main shrine at Sarnath it indicates the original ground floor of the earlier temple.

On the left, Brahmā is Brāhma with a *puthi*, cocoanut shell, a *pātra* and a libation ladle.

The *sikhara* consists of *ura-śringas*, *karna-śringas* and *nashṭa-śringas*. It is *chaturbhadra* and of *navāñdaka* class. The various planes and forms, rising by stages, appear to be a symphony mounting gradually to a final *crescendo* to the blue heavens. Each *bhadra* has a *chaitya*-window *gavāksha*, above which is a *kirttimukha* in high relief; from the *kirttimukha* streams issue to surround the *gavāksha* in which, within their concentric circles, there is a dancing divinity (*Natarāja*), encircled by dancing *gandharvas* (Pl. IV, fig. 4). The only evidence of dating is the name 'Acchyāmdhaja Jogi' in characters of fifteenth century A.D. Originally erected in c. twelfth century A.D., it was repaired in the fifteenth century A.D. The *mandapa* with pillars were erected in the nineteenth or twentieth century A.D.

TEMPLES OF MAHĀKĀLA AND BAIJNĀTH

The twin temples of Mahākāla and Baidyanātha (*vulgo. Baijnāth*) (Pl. V, fig. 5) might have been originally two separate temples but during repairs and rebuildings have been joined together with a common *samvṛitta mandapa* and an *antarāla*. The *mandapa* has a central hall with a domical roof. The *sabhā-mandapa* has a *pīṭha*, though due to a rise in the ground level the foundations are not quite clear. The *ardha-mandapa* has niches below pillars to contain images. Over a plain *kumuda*-moulding we have a floral ornament. Above it we have a series of male and female figures in various poses and attitudes, flanked by images of associated divinities in *kuṭas*. Above them are a series of smaller images of *parivāra-devatās* also within shrines. Finally, a frieze of *chaitya*-windows, flat on the surface. The image on the *lalātabimba* of the *urddhapaṭṭikā* of Baijnāth is damaged but on its left and right are two images of Siva, one with eight and the other one with ten hands. On the *uttarāṅga* we have Siva with Brahmā and Vishṇu on either side. The sanctum of the Baijnāth temple has not only an ornate door frame but a singular peculiarity. The cult image is a *lingam*. But what is of greatest interest is that on either side, the room has perforated stone windows (*jāli*) like the main temple at Pandara in Dhanbad district of Bihar state. That they are later constructions is evident from the fact that they occupy the position of niches on the eastern and western *bhadras*. The remaining niches contain the images of *Jinas*. But significantly enough, they are larger in proportion than the niches; with the result that left side of one niche at least has been hollowed out to make room for the image.

The *lalātabimba* of the doorway of Mahākāla temple has an effigy of Lakuliśa. Above him on the *uttarāṅga* we have Natarāja in the centre flanked by Brahmā and Vishṇu. The doorway is inferior to that of Baijnāth. The *sikhara* of the temples are rebuilt, and an analysis of the sculptures and the buildings lead to interesting results. Let us start from the *mandapa*. The niches below the pillars of the *mandapa* on all three sides with conventionalized *kirttimukhas* have flat surfaces as at Sarnath and possibly belong to c. twelfth century A.D. The damaged sculptures in niches may also be ascribed to the same period, but the frieze of sculptures as well as the images within *kuṭas* above it belong to the thirteenth century like those of the temple of the Sun at Ranakpur. It is quite clear that before the latter date, the temples that are mentioned in the rock inscription of Chāhamāna Somesvara II had disappeared. The reasons probably

are the various raids by the Turco-Afghans from Gujarat, Malwa and Delhi.¹ It was probably in the fifteenth century A.D., when Rānā Mokul (c. A.D. 1398–1473) conceived the idea of reconstructing the desecrated temples, that Bijolyā was revived and the temples reconstructed with old materials *in situ*, a point which will be fully dealt with later.

No account of the twin temples will be complete without a discussion of the *antarāla* (?) which gives access to the sanctums of both the temples. It is a square chamber, the interior walls of which are surmounted by an octagonal cornice which acts as the offset of the dome; this betrays Muslim influences. The centre of the room is occupied by the unfinished image of Nandi. The doorway to the right of the chamber provides access to the *garbhagriha* of Baijnath and that on the left to that of Mahākāla. On the left-hand side of the *antarāla*, there is a low narrow doorway giving access to a dark, small square chamber which has a flight of steps leading down to a well; another flight of steps leading up to a small chamber. The remarkable feature of this upper chamber is the large *kichaka* brackets on massive pillars built into the walls of the *vimāna* or *varandikā*, while others are embedded in the octagonal frame from which the domical roof of the *antarāla* springs. A fine early cornice is also noticeable.

Evidently, there was a well, roofed over by magnificent and massive brackets, before the present twin temples were erected some time after fifteenth century A.D. When this was done, the existing structure was not demolished, but included in the design of the new temples, so that they could serve as a hiding-place for the images in times of danger. One well in Mathura yielded a large amount of images. That it had a heavy roof is evident from the size of the brackets and the fragment of the cornice. It is also evident that if it had been an ordinary well it would have been filled up and removed. The fact that it was permitted to continue, and considerable pains were taken to have it integrated in the later structures, undoubtedly show the importance attached to it.

The applied figural sculptures, due to the ornate character of design, are many and, what is more, show W. Chalukya-Rāshtrakūta, Central Indian and finally Chalukya influences. The most important are: an image in a niche on the Uñdeśvara temple and another on the *mandapa* of the twin temples of Mahākāla and Baijnath. It has six hands. The two left hands are in *varadā-* and *vitarka-mudrās* while the rest are damaged. It has three faces. First is that of a boar, the second is human and the third that of a lion. Dr. H. Consens thought that it represents the joint *avatāras* of Narasimha, Kalkī and Varāha.² It has actually four faces of which the last was never carved, because it was in relief. It is probably Vaikunṭhanātha.³ The sculptures of Bijolyā can be conveniently divided into classes and ages. The first class consists of cult images. In this class there is no variety, as all of them are *lingams* or phallusi. The Hājāreśvara or Sahasralinga has its parallel in a *linga* in Hazaribag district of Bihar. The second class of sculptures consists of images of *parivārā-*, *pārṣva-* and *āvaraṇa-devatās* (gods),⁴ in alto-relievo or basso-relievo. Spiritually they are second only to the cult images, whose sight purifies the

¹ R. R. Haldar, 'Chitor and its Sieges'. *Ind. Antq.*, Vol. LIX, pp. 163–86; Vol. LX, pp. 1–5 and 21–23.

² *PR, ASI, of W.I.*, 1905, pp. 53 ff.

³ T. A. Gopinatha Rao, *Elements of Hindu Iconography*, Vol. I, pt. i, pp. 256–58. also writer's paper, 'Interesting Images from SE. Rajasthan', to be published in *Lalitbādā*.

⁴ P. O. Somapura, *Dipārṇava*, Chaps. 7–8.

devotee to a degree, enabling him to enter and worship the principal divinity in the sanctum sanctorum. They stand in *ābhanga*, *sama-bhanga* or *tribhanga* stances. Less formal are the images of *dikpālas*, *navagrahas*, etc., easily distinguishable from their *mukūtas* (*jatā*, *kirīta* and *karanda*), their *vāhanas* and *āyudhas*. The third class of sculptures consists of reliefs of *apsarās*, occurring on *jaṅghās*, *varaṇḍikās* or recesses between pilasters, represented as handsome youths and girls (e.g. on Undeśvara temple) with hands, in *añjali* and other *mudrās*, carrying flowers, playing flute or carrying objects (Pl. VI, fig. 6), and playing *mṛidanga* (Pl. IX, fig. 9). The fourth class is almost of mortals portrayed to symbolize common human activities, passions and emotions such as being disrobed, *mithuna* couples dancing, touching the breast, and in various other poses (Pl. VII, fig. 7). Most of the human types are aboriginal and their games, etc., also have a touch of the medieval forests, just the difference between Bharhut and Sanchi, a feature which they share with their prototypes at Chitorgarh.

The remains of plastic art at Bijolyā and its neighbourhood (e.g. Menālgarh) do not belong to a single age but are the legacies of various periods or dynasties of Rajasthan's colourful history. Bijolyā suffered sack and ruin several times, objective evidences for which exist. The Chāhamāna record mentions 25 Brahminical temples, remains of which cannot now be traced. The southern gate of the city walls is entirely built of ancient architectural fragments. The local tradition mentioned by Tod states that the whole city wall was built of ancient materials. But this is discountenanced by Bhandarkar. The image of *Trimurti* in the Mahākāla temple is possibly a late Pratihāra specimen. The same is the case with dancing Ganeśa (Pl. VIII, fig. 8). They lack the linear rhythm and plasticity of Gupta and Chalukyan sculptures. The conventionalized *jatā* of *Trimurti* is even later than the *Eka-mukha-lingam* of Ramnagar (Ahichhatrā) and the crude heaviness of form of standing Ganeśa with four hands are all evidences that indicate their age. At Sarnath there is enough material to study the transformation of the *jatā* from c. fifth century A.D. to c. twelfth century A.D. Commencing from the half-finished image of Maitreya and the inscribed Lokanātha image to *Andhakārimūrti* (c. fifteenth century A.D.), we have a series, many of which can be objectively dated to study the gradual emergence of medieval idioms. If we compare the *Eka-mukha-lingam* of Khoh with that of Ahichhatrā, the transformations are undeniable.

The medieval urge to express itself took the form of exuberant sculpturesque treatment of the exterior¹; the whole design was the result of a system, so that by looking at these figures of *gāṇas*, etc., an initiate could distinguish to what divinity the temple had been dedicated. The best champions of this medieval factor were the Paramāras of Malwa. Unfortunately, however, the areas, which received most attention from them, are Malwa and Rewa, with the famous cities like Ujjaini, Dhar and Mandu, all of which suffered vandalism at the hands of the iconoclasts. The second factor is that many of the specimens were in Rajasthan, where the Chāhamānas had an individual style. But this area, till 1946, was *terra incognita*. Geography, combined with a successful policy of utter conservatism, practised to prevent absorption in the British Empire, along with clan and dynastic rivalries, and decayed feudalism, etc., prevented archaeologists and art historians from reconstructing their cultural history. Yet, Rajasthan with its Rāṇas and Mahārāṇas, its Rājās, Rāvals and Mahārāvals

¹ Cf. Fig. 7 in Pl. VII.

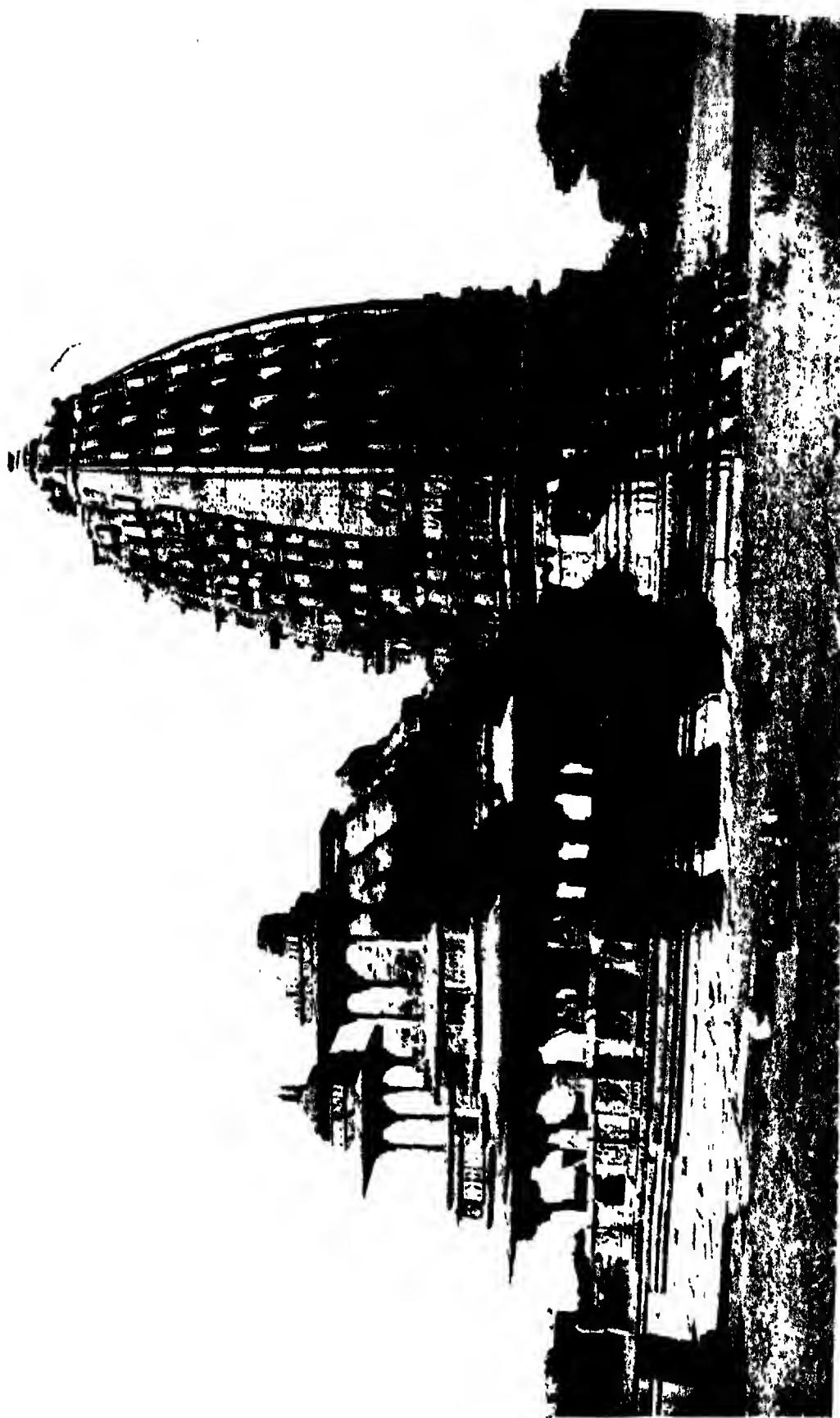
had since time immemorial a 'culture complex' of great magnitude. The Paramāras of Malwa, like medieval Buddhists, negatived the classical spirit, though their culture was broadly based on it.

The classical trend for sensuous modelling was lost.¹ The concave human forms sometimes have dignity but have no plasticity. By the eleventh century, the stolid heaviness of forms is left behind; and sculptures show angular faces, lesser linear rhythm and the bodies lack flexibility. This is true of Paramāra art in general, and those of Nemawar in particular. The majority of sculptures at Bijolyā belong to c. twelfth century A.D., and lack sensitive modelling. The figures are stereotyped. Yet, the medieval craftsmen (*śilpi*), or the *somapuras*, with their humanism enjoyed in bathing the creations with a deluge of forms. The *apsarās* on the *mandapa* of the Mahākāla and other Bijolyā temples are slim, slight personalities. But their outlines are very sharp, though carved out in low relief. The vegetal forms are not dynamic and have lost qualities of integration and co-ordination, so that instead of an illusion of interplay of plastic forms, an overemphasis on decorative enrichment has taken place. At a later date, possibly in the fifteenth century A.D., and even later, these fane were renovated and earlier sculptures *in situ* were sometimes utilized. The image of *Dēvī* in a niche, Siva (?) in the Mahākāla temple, *Mridanginī* (Pl. IX, fig. 9), Arjuna (?), etc., definitely belong to c. fifteenth-sixteenth century A.D. Still later are some of the sculptures in the Sahasralinga temple which are similar to few in Yugādiśvara temple at Ranakpur. The evidences of the cataclysm which took place are met with all over the place. Damaged sculptures in niches below the pillars of the *mandapa*, the rebuilt *sikharas* of the shrines such as Sahasralinga Uṇḍa-Mahādeva, the conversion of the twin temples of Baijnāth and Mahākāla including a well, the utilization of the images of Jain *tīrthāṅkaras* from an existing shrine of that faith and putting them in niches (*kuṭas*) inadequate to accommodate them, the *alindas* on the *mandapa* of the Uṇḍeśvara-Mahādeva are all evidences of later repairs and additions (Pl. X, fig. 10). The next phase of repairs probably took place in the nineteenth or twentieth century, the best example of which is the modern *sañvritta-mandapa* of the Sahasralinga temple. The last phase is still continuing due to the conservation measures undertaken by the Union Archaeological Survey.

¹ A. Banerji, 'Mediaeval Temples of Malwa'. *Journal of the U.P. Historical Society*, Vol. XVI, pt. i.

VII, 1965.

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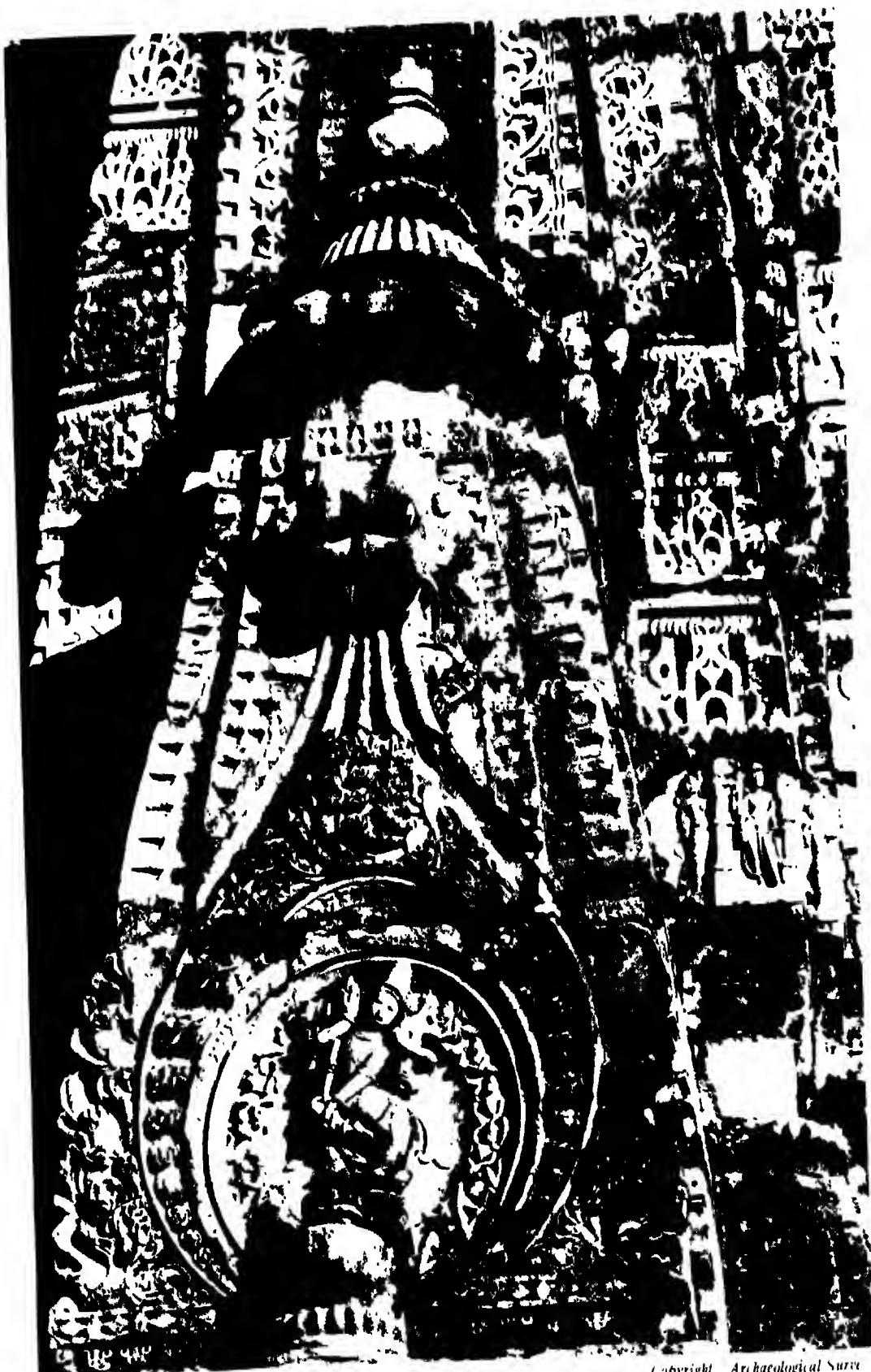
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FIG. 2. Door frame of the *garbhagriha* of the Uṇḍeśvara temple, c. twelfth century A.D.



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FIG. 3. Front view of Sahasralinga or Hajareśvara temple, Bijolyā, District Bhilwara.
Mandapa was erected c. A.D. 1800 and floor rebuilt

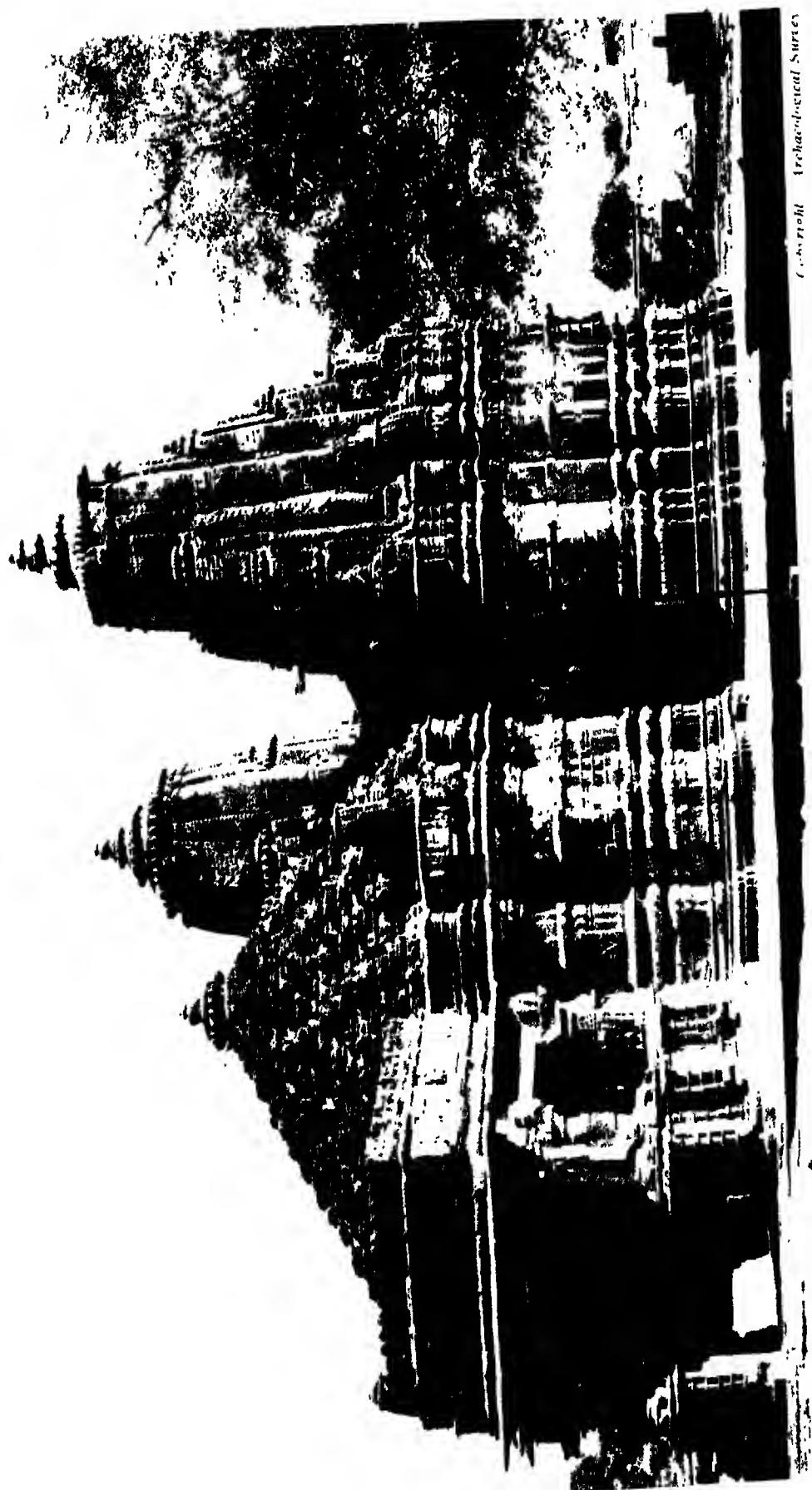


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FIG. 4. Details of *chaitya-gavâksha* on a *bhadra* of Sahasralinga temple, Bijolyâ.

PLATE V.

JAS, VII, 1965.



Central Archaeological Survey

FIG. 5. General view of the twin temples of Mahākāla and Bajnāth, re-erected c. A.D. 1500, with ancient materials. Bijnāth.



FIG. 6. Sculptures on *pithas*, on the *subbhāmardha* of Uṇḍesvara temple, c. sixteenth century A.D.
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FIG. 7. Details of sculpturesque *varandikā* of Undeśvara temple. They belong to c. twelfth to fifteenth century A.D.



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FIG. 8. Dancing Ganeśa, possibly Pratihāra, on Mahākāla temple, Bijolyā, c. ninth-tenth century.



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FIG. 9. *Mṛidanginī*, probably a Chāhamāna piece, Bijolyā, c. twelfth century A.D.
The term is derived from a labelled sculpture on the 'Tower of Victory' at Chitorgarh.



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FIG. 10. *Mridangini*, Bijolyā, c. sixteenth century A.D., showing loss of verbes,
rhythm and sensibility.

REVIEWS OF BOOKS

A HISTORY OF THE PATNA COLLEGE (1863-1963). By J. N. Sarkar and J. C. Jha. 9"×5". Pp. i-iv+1-170. Patna College, 1963.

Chapters I-IV written by Dr. Jagdish Narayan Sarkar deal with Genesis and Foundation (pp. 1-33), the Early Years, 1863-1881 (pp. 34-69), Slow Growth, 1881-1902 (pp. 70-88), Reorganization and Expansion, 1902-1909 (pp. 89-113). They give a readable and reliable account from the foundation of the College in January, 1863, to its progress till 1909 when the old system of Law classes attached to Patna College passed away. Relevant documents have been quoted and the story of the gradual development of Patna College through various vicissitudes has been narrated in an informative and interesting manner. From the description emerges the picture of Patna College as an integrated unit in the then system of education in Bengal and the story of Patna College to a large extent embraces the story of Bihar.

Chapters V-VII written by Dr. Jagdish Chandra Jha profess to deal with Further Expansion and Development, 1909-1927 (pp. 114-133), Consolidation and Progress, 1927-1952 (pp. 134-158), and A Period of Transition, 1953-1963 (pp. 150-170). The performance is disappointing. An outstanding event of far-reaching impact on the life of Patna College students was the upheaval in Patna in the 'Forties'. The present and future generations will hardly learn anything about it from these pages. There is a string of names of individuals and College societies. These are not comprehensive. A notable achievement of the period was the inauguration of Patna College Rowing Club. The person, who was, more than any one else, 'friend, philosopher and guide' of this venture, was Mr. Justice (later Sir) Francis James of the Patna High Court. At his instance two Putney racing boats were purchased directly from England. He used to come every day from the High Court to row with and coach the student trainees. He secured the services of many Europeans in Patna, who had rowed at Oxford and Cambridge, to help the Club. There is no mention of him.

The writer's language is sometimes unbecoming, e.g. 'the Best-Graduate classes were snatched away' (p. 159), he says without an attempt at assessing the underlying reason. Contents mention: Index, page 171. In the copy under review there is no such page and no Index.

A. BANERJI-SASTRI

AN ANTHOLOGY OF SANSKRIT COURT POETRY: VIDYĀKARA'S 'SUBHĀSITARATNAKOSH'. Translated into English by Daniel H. H. Ingalls; Harvard Oriental Series, Vol. Forty-four. 10"×6". Pp. i-x+1-583, Index 587-611. UNESCO Collection of Representative Works: Indian Series, 1965.

Vidyākara was a Buddhist scholar of Bengal who lived in the latter half of the eleventh century A.D. and probably worked at the monastery of Jagaddala, of which only the name survives in the ruins of a small village in Malda District in East Bengal. Vidyākara's collection has come down to us in two versions, each represented by a single complete manuscript.

The earlier version contained just over a thousand verses; the MS. is in the monastery of Ngor in Tibet. The translator has given no details of this MS. In the Second Search of Sanskrit Palm-leaf MSS. in Tibet published in *JBORS*, Vol. XIII, 1937, Part I, Rāhula Sāṅkrityāyana photographed a MS. No. 3, p. 54, belonging to Ngor, entitled 'Subhāśitaratnakōṣa', the name of the author being Bhimārjunasoma, not Vidyākara. This MS. also is complete, containing 1,500 ślokas. Professor Ingalls refers to the earlier version of 'Subhāśitaratnakōṣa' which 'when last heard of was reposing in a barn in the monastery of Ngor in Tibet' (p. 31). A comparison of these two Ngor MSS. may throw some light on the later version of 'Subhāśitaratnakōṣa' containing 1,728 verses, known from a copy made in A.D. 1710 and now in the Rajguru Library in Kathmandu in Nepal.

Vidyākara's 'Subhāśitaratnakōṣa' contains verses by over two hundred poets, from Kālidāsa to Viryamitra, from the fourth to the eleventh centuries A.D., most of them close to him in place, e.g. Vallana, Yogeśvara, Vasukalpa, Manovinoda, Abhinanda, and Viryamitra, who 'were all Bengalis, or at least easterners, of the time of the Pāla Dynasty' (p. 32).

The anthology divided into 50 sections contains a wide range of subjects, religious and secular, expressing various moods and suggestions, and is essentially an anthology of the middle classical period (700–1050) of Sanskrit, showing a special predilection for eastern or Bengali authors (p. 33), drawing mostly from the theatre and small kāvyas.

In the General Introduction to his translation, Professor Ingalls has made some useful observations regarding 'Sanskrit Poetry and Sanskrit Poetics' and 'on the Passing of Judgments' (pp. 2–29, 49–53). His views are refreshingly unsophisticated and sound. He effectively exposes Kosambi's theory of Sanskrit poetry as an application to India of Engels' and Plekhanov's theories of the class origins of literature (pp. 50–51). Says Kosambi: 'The poet is a talking house-bird. Sanskrit authors were reduced to writing almost exclusively of sex and religion, for the first was a harmless opiate and the second tended to the support of the *status quo* ... the *Subhāśita* literature ... could not reach the people, so its class interests remain unmistakable' (Text Vol., pp. xl–lxii). Professor Ingalls sums up succinctly: 'What can one say to such a theory?' (p. 51).

Professor Ingalls' translations are on the whole readable: without being too literal, they are accurate and adequate.

A. BANERJI-SASTRI

ÉTUDES VÉDIQUES ET PĀNINÉENNES. By Louis Renou, Professeur à la Sorbonne. Tome XIV of Publications de l'Institut de Civilisation Indienne, Série in-8^e. Fascicule 23, 1965. 10" × 6½". Pp. 132.

Just one hundred years ago, Alfred Ludwig translated for the first time the whole of the *R̄gveda* into German. It was published under the title 'Der Rigveda oder Die Heiligen Hymnen der Brāhmaṇa', with Commentary and Index in six parts in Prag in 1875–88. Since then, other useful translations of selected hymns and studies have been published by scholars and institutes interested in Indian language, literature and culture.

The Publications of the Institute of Indian Civilization started its eighth series, Fasc. 1, in 1956 with the first volume of Professor Renou's 'Vedic and Pāninean Studies', translating into French with critical notes—textual and explanatory—some Vedic hymns of sacrificial and historical importance. The present volume deals with 34 hymns to Agni (all from the tenth Mandala), Liturgy of Agni (8.72.681) to Agni Crematory

(10.16.842), to Agni Drunk (10.119.945), to Apām Napāt (2.35.226), to Sacrificial Post (3.8.242); 9 hymns to Āpri; 11 hymns to Indra and Agni.

In his notes, Professor Renou has elucidated the various characteristics of Agni, often in an original way: cf. p. 110, to Agni Drunk—*úpa mā matir asthitā*. ‘One has the impression that it is a man here who is placed in the scene, not a god. But the god can have borrowed the human language.’ Renou’s rejection of Hauschild’s interpretation of *áchāntsuh* 10.119.7 ‘have never seemed able to resist’; ‘in our opinion it is not necessary’ appears to be sound. From the sacrifice *áramkṛta* being called ‘*agnidūta*’, Renou concludes—‘the verse is undeniably Agnique’—cf. p. 111.

Professor Renou’s linguistic comparisons and comments are very useful; he has, as might have been expected, utilized most relevant suggestions, cf. Hoffmann Münchener Stud. (p. 87) on *dīvā...nāktam* and carefully avoids confusion between two originally different roots and between active and passive voices. He rightly says—‘the *RV* is the place of a vast secondary melange of homonym-roots’ (p. 87)..

A. BANERJI-SASTRI

SELECTIONS FROM OCHTERLONY PAPERS (1818–1825) IN THE NATIONAL ARCHIVES OF INDIA. Edited by Narendra Krishna Sinha and Arun Kumar Dasgupta. Published by the University of Calcutta, 1964. Price Rs.20.

This volume is the result of a scheme, formulated by the Indian Historical Records Commission, for the publication of English records in the National Archives of India by non-official Agencies. This volume was entrusted to the University of Calcutta and naturally the responsibility of editing it fell upon Dr. N. K. Sinha, Professor of History in this University. He selected the records, wrote the Introduction and prepared an analysis of the contents of the records. On account of his other pre-occupations the task of seeing the volume through the press, involving the solution of the problems of textual inaccuracies, was entrusted to Dr. A. K. Dasgupta, Reader in History, University of Burdwan. Both of them have done their work quite satisfactorily.

The value of such records for the proper understanding and reconstruction of the history of British India has always been recognized. This selection from the official correspondence of Major-General Sir David Ochterlony throws interesting light, among other things, on the internal history of, and the British policy towards, a number of Rajput States living under the protection of British Government, involving the sad end of the official careers of two great servants of the East India Company, namely Colonel J. Tod and Ochterlony. Tod was the Political Agent to the Western Rajput States, an office subordinate to the Resident of the Rajput States at Delhi. With the appointment of Ochterlony to this latter post constant conflict between him and Tod became the order of the day, and the occasional support of Tod by the Government of India as against Ochterlony embittered the relation between the two. Finally Tod had to retire in disgrace and it is generally believed that this was at least partly due to his open sympathy for the chivalrous Rajputs as testified to by his monumental work, *Annals and Antiquities of Rajasthan*.

Ochterlony also did not fare better. Nemesis seems to have overtaken him and the case of Ochterlony versus Tod was repeated. Ochterlony’s militant policy towards Bharatpur State was repudiated by the Governor-General in Council and he was asked to cancel his military

preparations against that State. Ochterlony resigned and died of a broken heart.

The general outline of these two episodes has been known for a long time, but the correspondence published in this volume enables us not only to appreciate the human elements involved, but also to trace, stage by stage, the developments that led to the final crisis. The documents also throw new light on various other incidents of great interest to students of British Indian history. This volume is a very useful addition to the original sources for the study of this subject.

R. C. MAJUMDAR

UTKAL UNIVERSITY HISTORY OF ORISSA. Vol. I (from the earliest times to A.D. 500). By N. K. Sahu, M.A., Ph.D., D.Litt. Published by the Utkal University, 1964. Pp. 531+xviii+42, with 21 plates and a few maps.

The ancient history of Orissa is an interesting section of early Indian history. Earlier works on the subject include R. D. Banerji's *History of Orissa*, R. Subba Rao's *History of Kalinga*, H. K. Mahtab's *History of Orissa* and Amar Chand Mittal's *Early History of Orissa*. The Utkal University has undertaken to publish a comprehensive history of the country, and Volume I under the scheme has now appeared. The said volume under review relates to the political history of ancient Orissa down to A.D. 500, in which Chapter I has been contributed by Dr. G. C. Mahapatra and the remaining seven chapters by Dr. N. K. Sahu. Chapter I deals with Prehistory and has an appendix on the prehistoric sites and a bibliography. Dr. Sahu's chapters also have bibliographies and a few appendices and begin with a discussion on Historical Geography (Chapter II). Chapters III-VIII deal with such topics as Archaic History, Kalinga under the Nandas and Mauryas, the Arya-Mahāmeghavāhana Dynasties, Kalinga during the early centuries of the Christian era and the Māثارas and their contemporaries.

The collection of data appears to be more or less satisfactory and the treatment fairly exhaustive. In the section on Historical Geography, the treatment of Odra is rather inadequate, especially because the author appears to be silent on the views of various scholars on the identification of Oddiyāna with Orissa or the Swat Valley, particularly those of Sylvain Lévi in the *Journal Asiatique*, 1915, pp. 105-10. The printing and get-up of the volume under review are not satisfactory. There are many misprints, and, in the use of diacritical marks, *n* and *ñ* do not appear to have been distinguished at all.

The writing of the history of ancient Orissa is rendered difficult, especially by the fact that the whole of modern Orissa was not a single political or geographical unit while ancient territories like Kalinga and South Kosala comprised only parts of the present State of Orissa. Thus it has to be made quite clear that the kingdom of the early Eastern Gangas of Kalinganagara (near Srikakulam in Andhra Pradesh) may not have comprised any part of modern Orissa and that the later Gangas, whose dominions often included the coast country as far as the Godāvari, may be regarded as Orissa, more or less theoretically for some time at least from the beginning, only after their conquest of coastal Orissa and the transference of their capital from Kalinganagara, first to Abhinava-Yayatinagar (modern Jajpur) and then to Cuttack.

In the present work, there are many points on which we are inclined to disagree with the learned author. Some of these relate to difference

opinion; e.g. we consider it impossible to believe that the Bhauma-Karas came to power in A.D. 736 (p. 105). Likewise we do not find any definite evidence in support of the suggestion that Khāravela ascended the throne about 40 B.C. (p. 319).

But there are other cases exhibiting what are really careless errors. Thus, according to Dr. Sahu, the *Mahābhārata* indicates that the northern border of Kaliṅga stretched up to the river Ganges (p. 75). This is due to misunderstanding because there is no such evidence in the *Mahābhārata*, which, on the other hand, puts the borders of the Kalinga country at a considerable distance from the mouths of the Ganges. Again, mention is made of the conquest of Kalinga in connection with Yaśodharman's *dīvijaya* (p. 92, note 3). But there is no reference to the Kalinga country in the records of Yaśodharman. Then again, Dr. Sahu thinks that *mukhya-kalā-vyavacchinna* cannot mean *gīta-vādya-samanvita* because *vyavacchinna*, in his opinion, only means 'cut off' or 'interrupted' (pp. 223 and 306). But any Sanskrit-English Dictionary would show that *avacchinna* or *vyavacchinna* also means 'characterized by' or 'distinguished by'. Thus *mukhya-kalā-vyavacchinna* would mean 'characterized by the principal arts (such as vocal and instrumental music)', i.e. *gīta-vādya-samanvita*.

We hope that, in the second edition of the book, the author will try to revise it in order to make the discussions more compact and pleasant reading and the publishers will print it in a better press.

D. C. SIRCAR

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CONTENTS

		<i>Page</i>
1.	<i>Paul Deussen's Indian Tour</i> By DR. PARESH NATH MUKHERJEE	113
2.	<i>The Antiquity of Terracotta Figurines</i> By SRI ADRISS BANERJI	121
3.	<i>Khāravela and Tramira Daha</i> By DR. RANJANA MUKHERJEE	129
4.	<i>Disposal of the Dead among the Mahishyas of Midnapur</i> By SRI TARASISH MUKHOPADHYAY	133
5.	<i>Rhythm in Sanskrit Syllabic Metres</i> By SRI AMULYA DHAN MUKHERJI	143
6.	<i>An Unfinished Rekhā Deul of Purulia</i> By SRI ADRISS BANERJI	163
7.	<i>An Evidence of Agrippa relating to the Parthian Empire</i> By DR. B. N. MUKHERJEE	167
8.	<i>Residential Segregation and Housing in a Desert Village</i> By DR. A. B. BOSE and SRI S. P. MALHOTRA	173
9.	<i>An Essay on Man : An Introduction to the Philosophy of Scientific Humanism</i> By SRI SHIBDAS BURMAN	181
10.	<i>Reviews of Books :—</i>	
	(a) <i>Role of Oriental Studies in the Humanities</i> By DR. R. C. MAJUMDAR	205
	(b) <i>Democracy in NEFA</i> By SRI NIRMAL KUMAR BOSE	206
	(c) <i>Dacca the Mughal Capital</i> By DR. J. N. SARKAR	206
	(d) <i>Madhura Sangita of Parasurama Ray</i> By SRI HIRANMAY BANERJI	208
	(e) <i>Bhāratīya Sādhanār Dhārā</i> By SRI HIRANMAY BANERJI	209
	(f) <i>Veda-Mimamsa</i> By SRI HIRANMAY BANERJI	210
	(g) <i>Research Efforts in Industrial Establishments in India</i> By PROF. P. RAY	210
	(h) <i>Atharvavedīya Paippalādasamhitā Prathama-kāndātmikā</i> By DR. A. BANERJI-SASTRI	211
	(i) <i>The Kautiliya Arthasāstra</i> By DR. A. BANERJI-SASTRI	212
	(j) <i>Bhagat Lakshman Singh : Autobiography</i> By DR. A. BANERJI-SASTRI	213

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PAUL DEUSSEN'S INDIAN TOUR

By PARESH NATH MUKHERJEE

The famous German scholar and Indologist, P. Deussen, and his wife boarded the *Himalaya* at Marseilles on 22nd October, 1892, reaching Apollo Bander on 6th November, 1892, and left India on 17th March, 1893, after touring various places and meeting all sorts of men.

He published a graphic account of this tour in his 'Indian Reminiscences' ('Erinnerungen an Indien')¹ from which all the material for this article has been taken. As a penetrating, well-informed, sympathetic and cultured observer, his accounts are both interesting and valuable as throwing very important light on the social, political, economic and intellectual life of the country in those days.

So, I shall discuss his narrative giving original observations in German in the footnote where necessary, since translation at many places can never convey the exact sense of the original. And I shall add my comments very sparingly, leaving the readers to judge in the light of Deussen himself.

He assures us that in spite of his brief Indian stay he had 'a deep insight into the life of the natives'.² This is true, as the narrative bears it out. Long after his journey, a letter of admiration reached him in Germany in which his name was Sanskritized as 'Deva Sena' (i.e. 'Deussen').³ It shows the unique impression left by him in India during his tour. Landing in Bombay he had a peculiar feeling that he had reached 'the holy land of India'.⁴

In Bombay he put up in Esplanade Hotel, and learnt that Gaya, Ujjain and other places were without any hotel. In Amritsar he had to barricade the hotel door with luggage as the door had no device to close it.⁵ In the 'Dak Bungalows' prices were fixed by the Government, but quality of food and service depended on 'capacity, goodwill and ambition of the almost exclusively Muhammedan cooks'.⁶ The best hotels were English that were very costly, where boarding and lodging cost per head Rs.5 per day, which included three rich meals in the case of a first-class hotel.⁷ He saw 'Kauri' (Sanskrit—*Kapardikâ*), which exchanged 5,120 pieces for Rupee one, and bank notes were in the denominations—Rs.10, Rs.25, Rs.50, Rs.100, Rs.500 and higher still. He saw a note for Rs.10,000. Glass manufacture had not yet started in India and so its use was very restricted.⁸ French wine and Rhenish wines were very common and cost Rs.3 per bottle.⁹ As service in Indian hotels was bad, people moved with their servants, and guides openly asked for their commission from shopkeepers for bringing foreign visitors to their shops in their presence.

In Bombay Pandit Venirâm was much disturbed lest Lalu the servant of Deussen should pollute him by his touch, for Europeans 'on principle are

¹ Deussen, Paul (Professor des Universität, Kiel)—*Erinnerungen an Indien* (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, pp. 256.

² Idem, p. 1, 'tiefere Einblicke in das Leben der Eingeborenen'.

³ Idem, p. 3, 'The letter was in Sanskrit.'

⁴ Idem, p. 18, 'den heiligen Boden Indens'.

⁵ Idem, p. 20.

⁶ Idem, p. 20.

⁷ Idem, p. 21.

⁸ Idem, p. 22.

⁹ Idem, p. 23.

Sudras'.¹ When Mansukhlâl Nazar, his host, left for Calcutta, he left instructions with Âtmarâm and Utsavlâl to look after Deussen's comfort. He visited the Tower of Silence, met a sadhu who spoke Sanskrit so fast that he found it difficult to catch up so that Professor Peterson sent him a young Pandit, Venirâm, to give him practice in Sanskrit conversation whom Deussen paid Rs.25 for his tuition of 25 days. Venirâm considered it a big sum. In Bombay he expressed the hope that every German Sanskrit scholar might visit India at least once in his life.² He held that the Parsis are of 'undoubted Indo-German origin', but that the Parsis of Bombay were of a distinct Semitic type and reminded him of 'our Jews'.³ He does not give any reason for this observation. Here Dhruva, who had met him in Berlin, invited him to Baroda, where he was a magistrate.

In the train when he left Bombay for Baroda, he told an Englishman how 'With all these natives in a week's stay in Bombay I have been extremely friendly'. The Englishman's reply to it was typical Anglo-Saxon, 'Quite possible, but we have to rule over them and that makes it entirely a different matter'.⁴

Third-class compartments were 'surprisingly cheap, but also frightfully overloaded'. Railway guards and drivers were mostly 'half-castes', 'mixtures of English and natives'.⁵

In Baroda, Mr. Maier, the Manager of the Maharaja of Baroda, who met him, was a 'South German'. With Maier he saw the Palace which had half a dozen cannon, 'alleged to be of solid gold'.⁶ Here in his honour 'Priyadarçikâ' was played. In the Sanskrit College he was requested to question the students on grammar, literature, astronomy and philosophy, and where the students could not reply they were helped by their teachers.⁷ A group photograph was arranged in his honour and the Indian photographer did not turn up as he had forgotten the appointment.⁸

He reached Ahmedabad on 28th November, 1892. It had 148,000 inhabitants, but no hotel. Only there was a 'Dak Bungalow', and that also at a distance. In Sabarmati Harilâl complained to him of the unfair and unjust I.C.S. selection introduced by the British. He believed that he had the capacity of becoming I.C.S., but that since the selection was made in England he could not avail of it owing to caste restrictions preventing him from going abroad.

Deussen regarded both Jainism and Buddhism as 'atheistic' systems.⁹ With due regard to his great erudition, Buddhism is not 'atheistic', but rather 'agnostic'. He noticed that the Jains were a rich community, and possessed great wealth. The Hindus would not kill any creature, not even a snake, and, in old houses, lived with snakes. They assured him that these snakes would not bite the inmates of the house.¹⁰ What a superstitious belief!!!

¹ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, p. 25, 'im Prinzip sämtlich Sudras sind'.

² Idem, p. 34.

³ Idem, p. 37, 'unsere Juden erinnern'.

⁴ Idem, p. 45, 'Wohl möglich; wir haben sie zu regieren, und das ist ganz etwas anderes', replied the Englishman.

⁵ Idem, p. 47.

⁶ Idem, p. 49.

⁷ Idem, p. 52.

⁸ Idem, p. 55.

⁹ Idem, p. 61.

¹⁰ Idem, p. 63.

From Ahmedabad he went to Jaipur. On the railway platform he recited with Dhruva's brother passages from *Meghadūta*. The guard (in spite of his promise and his duty) forgot to wake him up before Jaipur, and the train light was off, which put him to great inconvenience.¹ He went to hotel Kaiser-i-Hind. Jaipur's broad roads and gardens impressed him much. He saw the Maharaja's Garden, Museum and ascetics covered with ashes and who lay on pointed nails. 'They were in fact nothing other than beggars, who give themselves the appearance of ascetics.'² He liked the summer residence of Ambar, and saw crocodiles in a pond. He asked a Pandit (not knowing that he was blind from birth) how he became blind. The answer was 'typically Indian',³ 'owing to some sin of my previous birth'. Col. Jacob invited Deussen and told him, 'I treat the natives as children, and it turns out to be an excellent thing'.⁴ They discussed the problem of early marriages and consequent widowhood, but agreed that it had points both against and in favour of it. In the Sanskrit College at Jaipur pupils sat on the floor. They asked him about Kaiser William. Bismarck, Germany, if all Germans have a caste and if all Germans understood Sanskrit. They asked him also of his caste. Deussen said that he was a Sudra, 'for all foreigners according to the Brahmanical system are Sudras'.⁵

Now he went to Agra, where he saw the Fort, the Taj, and other places. He did not agree that the Taj Mahal is the most beautiful building on earth, for the Dome of Köln, Peter's Church in Rome, and Hagia Sophia in Constantinople are far more beautiful according to him.⁶ He discussed Yoga-vasiṣṭha with Lâl Baij Nâth, magistrate of Agra. Things were very cheap and for 20 penny, that is two annas, one could have a very sumptuous dinner.

Now Deussen toured Punjab, 'the oldest seat of Indian culture'.⁷ In Lahore at the head of the Arya Samâj was a young man, Hans Râj. Deussen held that whereas Brahmo Samâj was influenced by Christian and foreign influences, the Dharma Samaj by extreme orthodox native influences, the Arya Samâj was in the middle position in every respect.⁸ He went to Rawalpindi, a strong military station of the British, and saw Fort Jamrud. In Peshawar he had a debate with Dr. Stein and did not agree with Dr. Stein that the Indian of the *Rigveda* must have been an inhabitant of the northern mountain ranges, for in *Rigveda*, 333, Viçvâmitra worships the Vipâc and Çutudri together,⁹ and the Sutlej is to the south of Amritsar from where the mountain chains are over 100 kilometres distant. At the Peshawar railway station a Pandit appeared 'to greet us', and took him to the hotel where other Pandits and Dr. Stein appeared and the talk turned on astronomy.¹⁰

Now he went to Lahore where after his lecture under the auspices of the Arya Samaj on 14th December, 1892, he left for Amritsar, 'the land of the Sikhs', whose religion 'is a mixture of Indian (i.e. Hindu) and Muslim elements'. After visiting the Golden Temple he went to the Dak Bungalow

¹ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, pp. 65-66.

² Idem, p. 68.

³ Idem, p. 70, 'echt indisch'.

⁴ Idem, p. 71. N.B. Here no slur was meant. It is an instance of the attitude of 'Paternal Rule' and 'Benevolent Despotism' of those days.

⁵ Idem, p. 74.

⁶ Idem, p. 76.

⁷ Idem, p. 82.

⁸ Idem, pp. 86-87.

⁹ Idem, p. 97, 'zusammen feiert'.

¹⁰ Idem, p. 98.

where he met Mr. Summers, an M.P., who left for Allahabad the next day to attend the Indian National Congress session and died there of pox.

Deussen went to Delhi. There he saw Indraprastha, Kutab Minar, Chandni Chowk, Diwan-i-Am, Diwan-i-Khas, Moti Masjid, Jumma Masjid completed in 1658, Firozabad with Asokan inscription of 250 B.C. and Purana Qila. He met Pandit Bankelâl, who had a good collection of Sanskrit manuscripts, and presented Deussen among other books a manuscript of *Amarakoça*.

At Mathura and Vrindaban he was reminded of the similarity¹ in the birth stories of Christ and Krishna, and felt that 'it cannot be accidental'.² Two Pandits, Râdhâcharan and Madhusûdan, took him round Vrindaban. Both Arya Samaj and Dharma Samaj invited him to deliver lectures. He saw the place where the Banaras Maharaja, Prabhunârâyana, distributed gold equal to his weight to Brahmins, which was worth rupees one lakh. The theme was immortalized in a poem by Professor Gangâdhara. He saw Mahâban connected with the early life of Krishna. The people in Mathura were 'greedy of money',³ and were never contented with the gift made to them. This is a slur connected with our religious centres even to this day.

He went to Kanpur, where 'even in the railway station' he was greeted 'in the German language' by Mr. Bassler, a businessman, who took him to his house, which was a palace with many servants. He saw the Church, the Well in which many English victims were thrown in the 1857 Rising that 'The Englishman calls mutiny'.⁴ He saw the arsenal of Mr. Bassler with up-to-date weapons that the English Government gave free of cost to every European living in India so that in case of any native rising they might defend themselves.⁵ Domestic servants were cheap. Their salary was from Rs.5 to Rs.10 p.m. without food.

In Lucknow he was recommended to an excellent man, Mathurâ Prasâd, who was unfortunately not there when he reached Lucknow. He was invited to see *Cakuntalâ* played by a Parsi theatre group and did not like the play which was earlier condemned by Garbe in Bombay. As no conveyance was available he went in an 'Ekka', and when in the night the play was over the 'Ekka'-owner began shouting, for in the night his horse was stolen as he fell asleep.

At Ajodhya he was not allowed entrance in the temple of Ramachandra, in a 'very unfriendly manner',⁶ although he explained to the people in Sanskrit that he had studied *Ramâyana*. He left the place in disgust shouting 'Kruddhoshmi'.⁷ It is indeed to be regretted that such a distinguished Sanskrit scholar and Indologist was refused entrance and treated so shabbily.

In Banaras Deussen stayed in Clark's Family Hotel. As the members resented the visits of Indians and Pandits, he had to take them to the church compound close by for discussions. Near it the printing press of Professor Venis and the bookstall of his father-in-law, Lazarus, were visited by important people. On the 31st December, 1892, he was invited by the Maharaja of Banaras, who spoke English and Sanskrit and smoked a costly pipe.

¹ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, p. 110, speaks of the 'Ähnlichkeit'.

² Idem, p. 111, 'kann nicht zufällig sein'.

³ Idem, p. 116, 'geld-gierig'.

⁴ Idem, p. 120, 'Die Engländer nennen denselben the mutiny'.

⁵ Idem, p. 121.

⁶ Idem, p. 129, 'ziemlich unfreundlich'.

⁷ Idem, p. 129, 'I am angry'.

In his palace Çakuntala Room was of great interest as on its walls the scenes of *Çakuntala* were depicted. He refused to go abroad and when Deussen pointed out that the Maharaja of Baroda was just then staying in Europe, the Maharaja of Banaras retorted, 'Yes, he is a Sudra',¹ that is, not a Brahmin. They went to see the famous sadhu, Bhâskarânanda Svâmin, who was completely naked. From 4th January, 1893, every morning from 7 to 9 a.m. he listened to the lectures by Prof. Gangâdhara on grammar and literature, Prof. Sudhâkar on astronomy and Prof. Râmamîcra on philosophy in the university. One Govind Dâs met him, and described himself as a 'busy idler'. He had a very useful library in his house near Durgakund, and was a great Theosophist. The Maharaja at his request sent him three Pandits—Priyanâtha, Pramathanâtha and Bahuvallabha—to teach him more Sanskrit. Priyanâtha did not accept his advice to go to England even for his promotion, for he said that the eternal goods should not be bartered for temporal goods.² Deussen observed that a discussion of the political situation of the country was always painful, for the Indians deeply felt that they remained under the domination of the British.³

On 17th January, 1893, he went to Bankipur on the Ganges near Patna, and met Maheça Narayana, the Editor of the weekly, *Bihar Times*. Then he went to Gayâ and saw the Buddhist temple. After a brief stay in Râjagriha he went to Chandernagar where he saw for the first time Bengali Pandits.

In Calcutta he put up in Mrs. Monk's Hotel which was a 'little more costly than the Great Eastern Hotel'. In Bengal, in contra-distinction to the rest of India, there was Brahmo Samâj and not Arya Samâj, Pandits used chairs and did not sit on the floor, the people adopted a European mode of life. The Advocate, Mr. P. L. Roy, and the Professor of Philosophy in the Sanskrit College, Mr. P. K. Roy, lived with their families 'in completely European manner'.⁴ Mrs. Roy belonged to Brahmo Samâj, one of her unmarried sisters, Miss Chakrabarty, was brought up in a Boarding School in England as a Protestant, and another sister was a Catholic in Calcutta. Mr. P. K. Roy invited 20 scholars of the Sanskrit College who discussed *Kâthaka Upanishad*, *Kâdambarî* and other topics. Two Mullick brothers, who possessed a Dockyard, invited him to a dinner where 80 courses of Indian dishes were served.⁵ Mr. Mullick was the protector of Kalighat temple. Hara Prasâd maintained a school at his village Naihati that had 60 students. He took Deussen there and made him preside over a function. He was requested to ask questions in Sanskrit and the students replied in Sanskrit. At the close of the ceremony 'the unbelievable happened. Hara Prasâd hanged the "Yajñopavîtam" over my shoulder before all teachers and students'.⁶

On 1st February, 1893, he left Sealdah for Darjeeling where he put up in Woodland's Hotel. A Nepalese friend, who showed him the place, expressed great depression at India's political tutelage, and expressed the hope that a Messiah would some day arrive to 'break this chain of slavery'. He saw a Buddhist Monastery and the Observatory Hill for a better view of Kanchanjangha (Kâncana Çringa). He met in Kurseong Bazar one Mrs. Davidson, who was also touring India, but who gathered her information mostly from missionaries 'whom we mostly avoided' and 'led and

¹ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX. p. 135, 'Ya, der ist ein Çudra'.

² Idem, p. 145.

³ Idem, p. 145.

⁴ Idem, p. 154, 'ganz in europäischer Weise'.

⁵ Idem, p. 156, 'nicht weniger als achtzig verschiedene Gerichte'.

⁶ Idem, p. 159.

inspired by them undoubtedly carried home a very different picture than what we in our intercourse with the natives got',¹ writes Deussen.

Returning to Calcutta from Darjeeling Deussen met a Sannyâsinî who spoke very 'good Sanskrit',² and when he told her that owing to some sin of his previous birth he was born a Sudra and a foreigner, but now that he made a pilgrimage to India, visited Banaras, and seen 'You, O Holy One', he hoped to be born a Brahmin in his next birth, tears rolled down her 'eyes and fell over her cheek and breast'.³ Truly had Deussen entered the heart of India and Indians. With Mr. P. K. Roy he met Jîvânanda Vidyâ-sâgara whose father,⁴ Vâcaspati Migra, was the publisher of a famous Sanskrit dictionary. On 8th February, 1893, when he left Calcutta, Mrs. Roy gave him a 'huqqa' as a souvenir.

In Mughal Serai Govind Dâs introduced him to Col. Olcott.

In Prayag he put up in Laurie's Hotel, where Prof. Thibaut, Principal, Sanskrit College, Allahabad, was staying. Thibaut justified British rule in India for its blessings of peace and order and Mrs. Thibaut spoke of the Indians in 'sharp disdainful manner'.⁵ With Krishna Joshin he saw Triveni, Asokan pillar and 'Akshaya Bata'. With Roshal Lâl he went to address a meeting. An orator there expressed thanks and appreciation by shouting, 'Dhanyo'si! Dhanyo'si! Dhanyo'si!' and hoped that all men in India might imitate Deussen and all women Mrs. Deussen.⁶ At his request Krishna Joshin arranged for a performance of Indian music. After the performance Deussen felt that Indian music 'has something in it that penetrates to the innermost soul'.⁷

He now went to Ujjainî, 'the place of Kâlidâsa'. Then he went to Indore, where there was no hotel so that they stayed in the Ladies' Waiting Room in the station. At Ujjainî he had to write to the Governor, Sir Michel Filose, an Italian 'by birth', but 'completely Anglicized', for bread, as the town had no bread. He sent an elephant, his Secretary, Abdul, 'who was exceptionally modest and tactful for a Muslim'.⁸ He visited the House of Bhartrihari. Filose invited him to a dinner, where he spoke in Italian with the ladies.

He again went to Bombay, where 'every thing was markedly better and more elegant than one finds in Calcutta'. He met Tribhuvandâs, whose father was the famous man, Sir Mangaldâs. On 25th February, 1893, he addressed the Bombay Asiatic Society, at the request of its Secretary, Javerilâl Umiaçankar, who printed his speech in a brochure with translations in Marathi, Gujrati and Bengali (and not in Hindi, which may be of interest).⁹ He met the Sanskrit scholar and Chief Justice,¹⁰ Telang. When he left Bombay a Parsi young man, Mr. Ardeshir, travelled a few stations with him to discuss 'Theosophy' with him.

At Poona, Mr. Apte met him at the station. He also met Professor Bhandarkar (not clear whether Sir R. G. or Dr. D.R.).

¹ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, p. 172.

² Idem, p. 176, 'ganz gut Sanskrit'.

³ Idem, p. 178.

⁴ It is an error of Deussen: The father of Jîvânanda Vidyâ-sâgara was Târânâtha Tarkavâcaspati (A.D. 1812–1885), compiler of the dictionary *Vâcaspatya*.

⁵ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, p. 186, 'in scharfer, wegwerfender Weise'.

⁶ Idem, p. 190.

⁷ Idem, p. 191, 'hat etwas in sich, was bis in die innerste Seele dringt'.

⁸ Idem, p. 196.

⁹ Idem, p. 203.

¹⁰ Idem, p. 206, 'Oberrichter'.

On 5th March, 1893, he left for Madras. He met an old acquaintance, Mr. Oppert, visited Fort George, and met the Mahârâja of Vijayanagaram, whom Max Müller had described as a 'noble Prince'.¹ Deussen thanked him for his financial help to the Oriental Congress recently held in London.

Deussen now visited Tanjore, Madura and Trichinopoly. At Trichinopoly he had the painful feeling that within 24 hours he would be leaving 'the holy soil of India'.² Then he went to Tuticorin where he took the steamer for Ceylon on 17th March, 1893.

Such in brief is the informative and inspiring story of Paul Deussen's Indian tour, in which he met mostly representative Indians and few Europeans. He left behind us his 'Reminiscences', a book of great importance as throwing a flood of light on the social, political and economic situation in this country in 1892-93.

¹ Deussen, Paul (Professor des Universität, Kiel)—Erinnerungen an Indien (Verlag von Lipsius & Tischer, Kiel und Leipzig), 1904. Ch. IX, p. 215, 'edle Fürst'.

² Idem, p. 219, 'den heiligen Boden Indiens'.

THE ANTIQUITY OF TERRACOTTA FIGURINES, SPECIALLY
THOSE OF THE MĀLAVĪYANAGAR (NEW DELHI)

By ADRISS BANERJI

Riverine valleys of India offered abundant quantity of good quality of clay for manufacturing of wares and fashioning of images and figurines for worship in homes with a small budget as well as for children to play with. Various kinds of *degraissant* were not also lacking, such as sand, minute nodular stones, rice, wheat and barley husks, etc. They were generally done by potters (*Kumbhakāra* or *Kumhārs*). *Bhaviṣya Purāṇa* mentions clay images (*pārthivī*) amongst seven varieties of materials, from which images could be made (Book I, Chapter 131, Verses 1-3). *Viṣṇudharmottara* also mentions them. Gopāla Bhaṭṭa, quoted by Dr. J. N. Banerjea, mentions *lepaṭā* and *mṛinmayī* images in the *Hayaśīrṣa Pañcharātrā*. In the eighteenth *vilāsa* of the same work, earth from the river banks as well as *degraissant* to be used are specifically mentioned. A detailed procedure of their manufacture is mentioned by *Samarāṅgāna Sutradhara* (Chapter 73). The same is the case with *Aparājita Pricchā* (p. 12). The word 'image' in English is derived from Latin '*Imago*' just as the word *Icon* originated from the Greek term '*Ikon*'. An Indian image (*pratimā*), however, due to the system or the ritual of *prāṇapratisthā*, became personalities and individuals like any ordinary citizen enjoying the rights of gift, possession and inheritance. Many Privy Council and High Court decisions can be cited in support.

Just as images were made of clay, so were many other objects of daily use, which had not the remotest connection with devotion or worship. One of these were the toys: human and animal figurines, clay carts, daggers and sealings, etc. The potters who made these objects formed a caste by themselves and the knowledge and technique were hereditary. It was inevitable, therefore, that this important facet of plastic activity created a class of humble workers, seldom given a deserving position in the rigid social organization which their skill demanded.

A village potter would be making images, dolls and toys in their traditional 'primitive form' in the period when their fellow-workers in great cities like Taxilā, Puṣkalāvati, Rūpar, Hastināpur, Kanauj, Kauśāmbī, Pātaliputra and Tāmralipti would be exhibiting more advanced technique and fashioning religious or secular figurines influenced by Iranian, Greek, Romano-Hellenistic and Parthian contacts. Primitivism in art is to a great extent a confusing element, inasmuch as 'Primitivism' may stand for earlier or later or even contemporary technique. It depended on the contacts and skill of the individual potter working under particular geographical, economic and cultural milieu. Towards the commencement of this century, my grandmother used to bring clay and wooden dolls from Kālighāṭa which were archaic to a degree, with truncated hands and schematized drapery. The wooden dolls with their unifacial attitude, angular noses and eyes would have been regarded as cubical art; while at more advanced areas, in European and Indian shops, porcelain and English toys were available, too.

These observations are to be considered in explaining the primitive nature of the clay figurines. Some of these were eternal, while others show transformations. Dr. Stella Kramrisch has called them 'Ageless

type' or 'Timeless type' and 'Timed variations'. It is advantageous, in the interest of the subject itself, to appreciate that all assessments of Indian clay figurines are subjective to a degree. Objective evidence of two kinds: that is the context yielded by the spade and the palaeographical evidence are totally absent in the evaluation of their chronology. Mostly they are surface collections, like the Gāndhāra terracottas described by D. H. Gordon. The second class, such as Bulandibāg, Golakpur and Buxar figurines, suffer from lack of three-dimensional recording. In other words, the stratigraphy and their interpretations are not merely subjective but arbitrary, too. Recently, however, at Barodā, Maheśvara, Navdātoli, Prakāṣa, Rūpar, Ālamgīrpur, Hastināpur, Purāṇā Qillā, Kauśāmbī, Vaiśāli, Pāṭaliputra, Āhār and Kālibaṅgān certain amounts of materials have been well recorded; but with the exception of Barodā, Ahicchatrā, Hastināpur, Kauśāmbī (partly), Vaiśāli and Pāṭaliputra comprehensive reports have yet to be published. Yet, the importance of the art of clay figurines as an important feature of ancient Indian plastic activity is undeniable.

At present, scholars like C. C. Das Gupta, A. K. Coomaraswamy and Stella Kramrisch have assigned the terracottas with moulded heads, modelled bodies to the Mauryan epoch. S. K. Sarasvatī has, however, rightly pointed out that the tradition continued in the Śunga period.¹ In this respect, the sequence of Hastināpur and Kauśāmbī, fixed by association with N.B.P., etc., wares might produce some results. Terracotta plaques with female or male figures may or may not belong to the Sunga-Kāṇva period, though close stylistic analogy points to this direction. They are not archaic, but primitive to a degree; notwithstanding the elaborate head-dresses and ornaments, they are remarkable for the significance of their forms. Like Bārhut they seem to breathe of primeval forests and their culture, with a veneer of sophistication due to the use of well-known symbols. The complex *coiffure* and drapery, the predominant unifacial presentation, like the lithic sculptures, all point to a primitive form of art and ritual intermingled with early Brahminical, Jain and Buddhist symbols.

Very soon, like Sāñchi, Amarāvati and Bodh-Gayā, more advanced specimens, pleasing to the art critic, with higher relief, refined forms, more sensuous modelling, better disciplined contours; gradations, depths and planes appear, heralding the dawn of a new epoch of plastic expression. They breathe of a progressive urban culture and not urbanization, and with them disappear the vista of vast open spaces containing small hamlets with sacred trees containing animal and human figurines as offerings to propitiate the divinities.² At this age, the centres of this prolific art were Rūpar, Hastināpur, Mathurā, Kauśāmbī, Vārāṇasi (Rājghāṭ), Pāṭaliputra, Vaiśāli and Tāmralipti, etc. In the Śaka-Pahlava and Kusāṇa periods, varied regional styles developing under the influences of different ethnic, social and political conditions commence. The most noteworthy are the clay figurines from Sār-Dherī and other allied sites in Pakistan and Afghanistan described in his *magnum opus* by late Col. D. H. Gordon. Then there are the clay figurines of Rang Mahal, Mīrpur Khās, Mathurā, Kāśipur, Ahicchatrā, Domingarh,³ Rājghāṭ, Bāngarh and Kauśāmbī, etc. The figurines of Sār-Dherī and Kāśipur are now stored in Central Antiquities Section, New Delhi. S. K. Sarasvatī is right in pointing out that

¹ *A Survey of Ind. Sculpture* (1957), p. 107.

² In Deoriya district, besides the road from Gorakhpur to Kāśiā, the author found figurines of elephants, etc., under trees almost in every village.

³ Cf. the present writer's 'Antiquities from Domingarh' *J.U.P.H.S.* (N.S.), Vol. VII, pp. 86 ff.

'The terracotta art of this period seems to represent a movement, parallel to the contemporary plastic art in stone, and bears the stamp and impress of the latter.'¹

The decline and fall of the Gupta empire brought about a degradation in the quality and plasticity of this art which grew to a classic stage originating as a folk art. For a time, it maintained its original humanism, worldly and physical mindedness, but lost vigour, lacked well-modulated forms, remarkable for their lithe grace, balance and poise in repose, smooth-flowing contours and sensuous rhythm, which had gathered momentum. Ironically enough, it again became a folk practice, confined amongst the rural population and survived amongst them when the decayed and decadent urban civilization of India, with its medievalism, toppled down under the sword-cuts of Turkish converts to Islam. That explains the importance of terracotta figurines from Theh Polār in Āmbālā district, Hastināpur in Meerut district, and Mālavīyanagar objects under discussion. In Bengal, it survived as an applied art on hut-shaped temple architecture, in Birbhum, Bānkurā and Tipperāh. It was adopted by Muslim invaders to heighten the dignity of their *masjids*, *idgāhs*, *Khāngāhs* and tombs.

TECHNIQUE

The technique is neither archaic nor primitive but crude. They are all hand-modelled figurines of burnt clay (*pakva*). Ornaments, eyes, saddles, etc., were due to extra layers of clay or pellets used by the age-old appliqué method, punched with a blunted tool when the clay was still soft. Then they were dried in the sun and finally burnt. The damaged portions betray grey cores inside solid legs and necks. This is a difference which they show with their prototypes at Theh Polār. The horse-necks ~~had~~ at Hastināpur were hollow. They were well-burnt and made of local clay. No *degraissant* was used. The material is pure and simple virgin clay.

DATE

In absence of the context yielded by the spade, it would be hazardous to assert any definite opinion about the age of these clay figurines. The crude human figurine, the only one of its kind, has undoubtedly parallel with the objects of its class found in protohistoric sites, particularly those primitive clay figurines of grey clay found in abundance at Mathurā. Indeed, the style here, which many people would call archaic, is misleading to a degree. This is the danger of subjective dating. It is an 'Ageless type' as defined by Dr. Stella Kramrisch. It appears that centuries ago there was a village between Meherauli and a modern refugee colony of Mālavīyanagar in South Delhi; like period V at Hastināpur and Theh Polār, where resided potter or potters who made these figurines. This hamlet must have been wiped out by Mongol raiders or the hordes of Taimur the Lame, who established his camp after razing Loni to the ground to storm the capital city of Muslim India at Hauz-i-khās. The monuments of Rāmakṛiṣṇapura lost their records when the population suffered the fate of Bhātner. They were saved probably by their character and affiliation. The same is the case with figurines of mastiffs, hounds or dogs. Stylistically again, they are similar to those found by E. J. H. Mackay at Mohenjodaro. In fact, the affinity is dangerous. Nevertheless, beyond pointing out this puzzling analogy, we have to tighten the

¹ *A Survey of Ind. Sculpture* (1957), p. 116.

reins of our imagination lest we should fall in the dangerous quagmire due to absence of discipline. Between chalcolithic culture of the Indus valley and those of Mālavīyanagar figurines lie a hiatus of more than a millennium. We can only explain it again as the ageless technique of potters in backward areas of this vast subcontinent.

None the less, we may pardonably claim indulgence of the scholars in indicating the possibilities of the animal style. Though we must never lose sight of the fact that a general similarity in such stylistic features need not necessarily imply contemporaneity, but may involve a relationship in which one culture is ancestral to another at some interval of time. At the greatest, they may stand for chronological equality. This type of animals was first found at Theh Polār, excavated at the instance of D. R. Sahni, by late H. L. Śrivāstava. But due to their subjective methods of excavation, the dating of the stratification left much to be desired. But the objective method followed by B. B. Lāl at Hastināpur, whose Period V yielded similar horse-heads, helps one to date the finds of Theh Polār. Both at Hastināpur and Theh Polār the criteria of dating are furnished by coins of Ghyās-ud-din Balban (c. A.D. 1265-67) and also that of his successors, at the latter place.

POTTERY

This type of pottery can be very securely dated due to the excavations carried out by Hilary Waddington at Ādilābād in the neighbourhood of its more celebrated contemporary, the Tughlaquābād.¹ Just like Mālavīyanagar, all the three sites have yielded both glazed and non-glazed wares. Black-washed pottery has also been found by Y. D. Sharma at Lāl Kot II, that is the second city at Lāl Kot built by Qutb-ud-din Aibak, on the rubble and shambles of Tomara Yoginipura or Dhiliika, as it was then known. Though some excavators feel that glazing was known to ancient Indians, I hold that the evidence is too meagre at Ahicchattrā and possibly due to disturbances by later residents to warrant any definite hypothesis. Glazed wares in all probability were imported into India by the Turks in the twelfth century A.D. and by the next century it was widely prevalent in North India, which also developed few manufacturing centres. In 1952, the present writer along with Prof. K. De., B. Codrington and late K. N. Puri paid a visit to the famous site of Bhitri in Ghāzipur district of U.P., which proved to have been a principal centre for manufacture of glazed pottery. Huge amounts collected by me were left in the Sārnāth Museum.²

Glazed Pottery

There is only one class of glazed pottery collected by Śri Manohar Lāl from the site, unlike Hastināpur. They are all of white colour, not even whitish and of a 'sandy friable texture'.³ The particles of which they are composed are hard, having little or no cohesion. The core is virtually a sand mass difficult to form into shape. The colours are of two kinds: chocolate and blue. The designs are either geometric or floral. Though lack of large amount of specimens is a handicap, none the less the principal

¹ *Ancient India*, No. 1 (1946), pp. 60-76.

² Cf. B. B. Lāl, 'Examination of Some Ancient Indian Glass Specimens', *Ancient India*, No. 8 (1952), p. 27, fn. 4.

³ *A. II* (Nos. 10 and 11), p. 71.

forms may be presumed. The shallow bowl and the plate admirably served the purposes of eating *cāpatis*, curries and vegetables. Most of them had ring stand bases, which, we shall see, was also the case with ordinary ware manufactured by Indian *Kumhārs* (potters). This I think is an intrusive element in ceramics of Muslim India used by the masses. It is an axiomatic truth that glazed pottery was probably used by comparatively well-to-do classes, the imposed Muslim military hierarchy, yet to become ennobled in course of time. The *Zimmis* and the poorer sections of their camp followers, as well as the unfortunate converts, went on using the home-made pottery.

The designs were painted on the 'bisque' and then received a coat of glaze. At least one sherd has a silvery lustre, possibly due to micaceous elements in the clay or more probably due to the glaze. One circular disc differs from others. It has green glaze which has survived on one side only and the clay is red 'moiré' deposited through millions of years on the bed of 'Alwar outliers' by riverine action. Excavations of deep trenches and pits at Rāmakṛiṣṇapura, a neighbouring colony of Mālaviyanagar, for laying sewages and water pipes have shown that for a depth of 40 to 50 metres the deposits are firm Gangetic alluvium with little or no indication of disturbance due to human occupation. This disc with red medium core and turquoise green glaze has a lesson for us, inasmuch as it shows the use of native material. The industry of making a glazed ware was taking place on the Indian soil, with Indian clay, possibly with the help of the sons of the soil.

Unglazed Pottery

The other pottery, deep-rooted in Indian practice, is of two varieties. ~~It~~ a red ware made of local alluvium, which takes a pink or red colour when well-burnt. The other is a grey ware with black wash. The forms in the former are large jars (*nāds*), small jars (*kalasas*), conical bowls with flat bottoms or ring bases (*divās*), spouted jars, shallow dishes with ring handles, small jars and dishes for children and finally three lamps. It is this last item which calls for notice. They are pink or red, pinched at the front to allow the wicks to burn and have flat bottoms. This again has affinities with the chalcolithic past of India. Similar earthen lamps have been found at Nāl in Baluchistan. But with a difference. Nāl lamps are painted while our examples are plain. Nāl lamps are pressed on four sides, providing four mouths. In the examples under discussion only two sides are pressed. Some of the pots, it seems, had solid legs to aid in lifting—one of which has been recovered. They were made of well-levigated clay, devoid of any other *degraissant*. It is a sandy ware, originally of buff colour. Many of them were decorated, motifs being shallow concentric circles in low relief, solid dots or circles within concentric circles with raised borders, rectangles within two concentric curves and solid hatches. In some, particles of mica are noticed, possibly found in virgin condition of the soil selected. One rim of a red ware is black at places but red in the interior, which, the present writer feels, is due to accident of overfiring.

The other ware is grey with or without black wash. This is a ware which has not been found at Hastināpur. But it can now be securely dated due to the excavations of the fortifications of Qillā Rāi Pithorā or Lāl Kot II, the *terminus ad quem* of pre-Muslim archaeology of Delhi. The extensive walls, only fragments of which are now visible, are credited to Prīthvirāja II, the husband of Suhavadevi or the 'Testy Queen' of

Mainālgarh inscription. Pottery found here, illustrative of two distinct cultural epochs, separated, *significantly*, by a layer of ashes and rubble of fallen buildings. The earlier pottery is plain red ware. The second phase, distinguished by infiltration of glazed ware, ascribable to Turco-Afghan period, yielded a grey ware with black wash.¹ The entire pottery of this class is wheel-made. The clay, as a rule, is medium, tempered with sand, which often contains larger particles of grit; usually no surface wash is met with, as in the case of carinated *hāndī*. Wherever met with, it approximates to the colour of the paste. An attempt at creating a pleasing effect is seen in few sherds by application of powdered mica in the clay or dusting it on the pots when the clay is still soft and before firing. The forms are ageless. *Hāndīs*, shallow dishes, saucers, etc., lugged, spouted or handled varieties are not met with in this ware.

HUMAN FIGURINE

1. A damaged hand-modelled figurine, remarkable for appliqué technique as well as pinching. The necklace (*kaṇṭha-hāra*) and edges of the drapery are indicated by punches made with a wooden object. Consists of head (damaged), arms and torso. No legs, since the pedestal base was scraped off. Holding probably a child or some object on her lap. Arms truncated. Similar to Fig. 1, Group I. Type I (Stratum VIII: c. 300–200 B.C.) found at Ahicchattrā. But not so early. It has analogies with the figurines found in the clay votive tanks of Ahicchattrā (Group IV, Type 8, Plates XXXVIII-XXXIX, 87-89).²

ANIMAL FIGURINES

Most of the animal figurines are those of horses, some with saddle.

2. Neck of a horse. The manes are shown by parallel incisions, made by a sharp instrument of irregular length. The nose, eyes and faces are damaged. Only one ear has survived. Immediately below the neck there is an elevated piece not unlike a halter.

3. The neck and upper body of a horse. The legs and face are missing. The manes are shown by a stiff ridge over the long neck and above it is a piece of clay bearing parallel rows of lines making rectangles. The saddle is on the back.

4. Long neck with part of the forelegs of a horse. The ears and eyes have been made by pellets attached to it. Badly fired. Traces of red wash. The face is almost like that of a camel. But such horse-heads have been found in Period V at Hastināpur in Meerut district by B. B. Lal;³ and at Theh Polār by late H. L. Srivastava, described by me elsewhere.⁴ It is a typical feature of clay figurines of Muslim period from Balban's time. The style here is a criterion established by three-dimensional recording.

5. Very much damaged body and neck of a horse with traces of red slip. Well fired.

6. Legless torso of a horse with a saddle and possibly a rider. Well burnt and no trace of slip.

7. Legless torso and neck of a horse. Manes recently damaged.

¹ *Ind. Arch.—A Review*, 1957-58, pp. 24-25.

² *Ancient India*, No. 4.

³ *Ibid.*, Nos. 10 and 11 (1954 and 1955), p. 86. Plate XLV.

⁴ To be published in the *Proceedings of the 26th International Oriental Congress*, 1964.

8. Torso with stumps of hind legs of a horse with saddle. Traces of red slip. Well fired. No *degraissant*.
9. Neck and part of the forelegs of a horse. Manes are shown as a stiff high ridge, damaged at one or two places. Signs of halter below the ears. No slip.
10. Torso of a horse with saddle. Well-fired.
11. Torso of a smaller horse figurine with tufted tail. Neck and legs missing. Damaged portions show grey sections.
12. Similar to above.
13. Torso of a small figurine of a saddled horse with stumpy legs to serve as stands.
14. Well-fired torso with portion of a neck of a horse. Legs missing. Damaged manes are shown as a stiff high ridge above the neck.
15. Portion of neck and torso of a horse—saddled. Manes treated like the previous one.
16. Torso of a horse pinkish in colour. Saddled. The manes are, however, shown as flowing on either side of the neck and the shoulder by parallel striations made when the clay was still soft.

MASTIFF: DOGS OR HOUNDS

17. A figurine of a mastiff or dog. Legs missing. Only the head and part of the torso survive. Collar on the neck by appliquéd technique, with holes made by an instrument. Nose was made by pinching and two eyes were added by pellets with pin-holes at the centre. Mouth appears like the bill of a swan due to pressing. The upper and lower lips are indicated by a shallow incised circle made at the edge. A similar figure was found by E. J. H. Mackay at Mohenjodaro.¹

18. Very small figurine of a dog with remains of the left foreleg, tail and head. Unlike No. 17, the face has been made by depressing the front. Eyes were added by two circular pellets with holes at the centres and a ridge left between them to indicate the nose. The head contains ears made by circles.

19. Figurine of a dog with a short tail. Eyes are indicated by holes. At the back just above the tail, drapery indicated by round and rectangular depressions between two parallel lines.

20. Legless figurine of a dog with portions of the head. The collar at the neck was made by a layer of clay applied bearing rectangular incisions. Rectangular marks within parallel lines showing probably drapery. Short tail.

21. The head of a dog, with tongue lolling out. Eyes were made by applied pellets of clay. Head shown as a small elevated ridge. Ears. Remains of a collar at the neck.

POTTERY

(a) Glazed ware

1. Plate with a ring base. Of whitish sandy fabric, painted in a chocolate brown colour picked out with white on the inside. The design is within two concentric circles.
2. A small fragment of the same or another plate.
3. A small fragment of whitish sandy fabric with a floral design picked in chocolate. On the back a solid circle, etc.

¹ *Further Excavations at Mohenjodaro*, Vol. II (1937), Pl. LXXX, No. 10.

4. A small fragment of a bowl with floral decorations in light blue.
5. Flanged rim of a dish of white sandy fabric painted in light blue, having a somewhat lustrous surface.
6. Base ring of red medium core with deep green glaze inside.

-(b) Grey ware

7. Rim of a large trough (*nād*) with an oblique nail head-rim of grey clay with black wash and coarse fabric.
8. Rim of a basin of a grey ware of coarse fabric and black wash. Variant of 7.
9. Vase (*hāndī*) of grey ware with flared featureless rim, and a concave girth.
10. Rim of a trough of coarse clay with traces of black wash and flat base. It has an obliquely bevelled rim.

(c) Red ware

11. Vase of red ware with remains of a spout on the belly. The rim is vertical and featureless and possesses a short neck. Of medium fabric and is devoid of any slip or wash.
12. Rim of a storage jar (*jālā*) with a concave shoulder and internally grooved ovoid body. Of medium fabric and treated with bright red slip. The short neck is carinated.
13. Basin of a dull red ware with an inturned externally collared rim and possibly a flat base. Of medium fabric but traces of slip or wash lacking.
14. Rim of a large trough of medium red fabric and an oblique nail head-rim.
15. Lamp of a medium red clay with ridge-like vertical rim. Pressed on one side to permit two wicks to be burnt. Flat base. No traces of polish or wash.

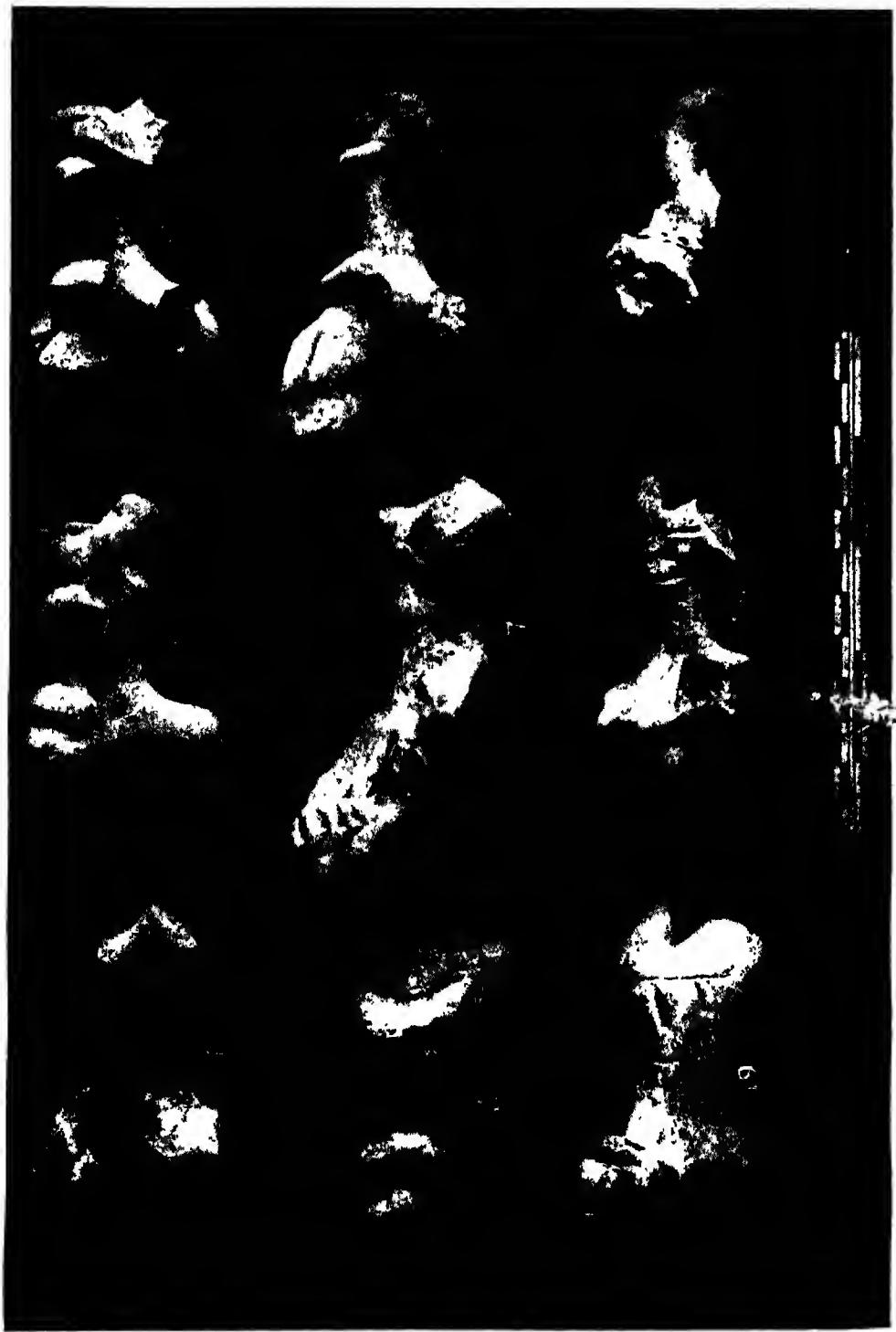
AS, VII, 1965.

PLATE I.



(Top right), Archaeological Survey,

Terracotta figurines from Mālavīyangara.



L. P. M. L. S., Archiv für Seeschiffahrt



Glazed and unglazed wares from Mālavījanagara.
C. P. R. S. I., Archaeological Survey.



Fig. 1. *Conularia* sp. (Murchison) from the Lower Silurian of the Malvern Hills, Herefordshire, England. *Conularia* sp. (Murchison) from the Lower Silurian of the Malvern Hills, Herefordshire, England.

PLATE V.

JAS, VII, 1965.



Copyright, Archaeological Survey.

Terracotta horse's head from Mâlaviyanagara.

KHĀRAVELA AND TRAMIRA DAHA

By RANJANA MUKHERJEE

A passage in the Hathigumpha inscription of Khāravela, the reading of which is fairly certain,¹ can be transcribed as follows:

'... puvarājanive (?) sitam Pithumdam gadabha-namgalena kāsayati janapada-bhāvanamca terasa vasasatakatam bhi(m)dati Tramira daha samghātam'²

The above passage may be rendered into Sanskrit in the following way:

'... purva-rāja-nivesitam Pithumdam gardhabha-lāngalena karsayati janapada-bhāvanamca trayodaśa-varṣa-satta-kṛtam (yadvā kṛta-sattam) (yadvā trayodaśa-varṣa-śata-kṛtam) bhinatti Tramira-hrada-samghātam...'

The English translation of the passage may be given as follows:

'... causes Pithumda, founded by a former king or kings, to be ploughed by an "ass" plough and destroys the confederacy of the Tramira lake (whose) existence (has been) accomplished (for) thirteen (or hundred and thirteen or thirteen hundred) years and which has been a source of anxiety to the countryside.'

It is quite clear from the contents of the above epigraph that King Khāravela of Kalinga was responsible for ploughing by an 'ass' plough³ (i.e. or the destruction of) the city of Pithumda as well as for the annihilation of the confederacy of the Tramira lake (i.e. the league of the people or states around the Tramira lake). The coupling of both the incidents indicates probably that these two events were not unconnected with each other.

The Hathigumpha epigraph enumerates the achievements of Khāravela year by year.⁴ Unfortunately, the portion of the text which, *inter alia*,

¹ *Epigraphia Indica*, Ootacamund and Delhi, vol. XX, pp. 79-80; D. C. Sircar, *Select Inscriptions Bearing on Indian History and Civilization*, vol. I, Calcutta, 1942, pp. 209 f.

² Our reading of the epigraph is based mainly on the facsimile of the inscription published in the *Journal of the Bihar and Orissa Research Society*, Patna, vol. III (1917), pl. 1 facing p. 972, and also in the *Indian Historical Quarterly*, Calcutta, vol. XIV (1938), pl. I-VIII.

K. P. Jayaswal and R. D. Banerjee read *Avara* in place of *Puvarāja* and following the cumulative evidence of the *Bhāgavata* and the *Viṣṇu Purāna*, interpreted *Ava* as a name for the *Andhras* (*EI.*, vol. XX, p. 84). However, the correct reading seems to be *Puva* and not *Ava*. D. C. Sircar is also probably wrong in reading *puvam* (D. C. Sircar, *op. cit.*, p. 209).

Puva should not indicate the name of a dynasty because in another passage, also of the same epigraph, the expression *puvarājanivesitam* is used in relation to another place (D. C. Sircar, *op. cit.*, p. 208, L. 5). Therefore *puvarājanivesitam*, used in relation to two different areas, should indicate that the expression meant 'founded by former kings'.

The correctness of Barua's reading *Pithuda gadabha nagale nekāsayati* (*IHQ.*, vol. XIV (1938), p. 467) depends to a great extent on the identification of the letter before *kāsayati* as *ne*. Consequently we cannot accept Barua's interpretation of the passage in question (*ibid.*, pp. 478-79).

³ It is interesting to note that according to the *Avasyakavritti* and Hemachandra's *Viracarita*, Kanika ploughed Vaisali with ploughs drawn by horses (*JBORS.*, vol. XIII (1927), p. 231, n. 1; *EI.*, vol. XX, p. 88, n. 3).

⁴ D. C. Sircar, *op. cit.*, pp. 207 f.

seems to have contained the name of the year witnessing Khāravela's achievements in question is now mutilated. Since, however, these conquests are recorded between the descriptions of his expeditions in regnal years 10 and 12,¹ the events concerned may have occurred in the eleventh year of his reign.

S. Lévi² very convincingly identified Pithurīda with Pithurīda of the *Uttaradhyāyanasūtra*³ and also with Pityndra, the metropolis included by Ptolemy among the inland cities of Maisolia.⁴ It is quite clear from Ptolemy's description of the territory of the Maisoloi, referred to also as Maisolia, that it included the region lying near the mouth of the river Maisolas.⁵ As the latter can be identified with the Krishna, the areas on the lowermost Krishna were in Maisolia. This is further supported by Ptolemy's evidence about the inclusion of Benagouron in the territory of the Salakenoi which was contiguous to that of the Maisoloi.⁶ Benagouron is identified with modern Peddavegi in the West Godavari district.⁷ Hence the territory of the Maisoloi, described as contiguous to that of the Salakenoi, may have indeed been situated not very far from the Peddavegi region. This suggests that Pityndra was probably on or near the Lower Krishna and not far from the Godavari district area.

It is likely, as remarked above, that the destruction of Pithurīda (= Pityndra) was not unrelated to Khāravela's expedition against the peoples or the states around the Tramira lake. So the latter may have been situated in or near to or at least not very far from the Lower Krishna.

This hypothesis is rendered almost certain by several factors. It is well recognized that *Tramira* can be considered as a variant of Dravida.⁸ The latter name denotes a territory, which, according to the *Mahābhārata*, included apparently the lands along the coast immediately to the south of the Godāvāri.⁹ Hence a lake, situated between the Godāvāri, Krishna could have been called as a Dravida one or a lake of the country.

In fact the most conspicuous lake in peninsular India is situated on the borders of the modern districts of Krishna and West Godavari, viz. the Colair lake.¹⁰ The locality around this lake may be connected with the region of Kaurāla mentioned in the Allahabad pillar inscription.¹¹ The same lake is probably described as the water of Kunāla in the Aihole inscription of Pulakesin (II).¹² These testimonies suggest that the lake was well known in the early centuries of the Christian era. Hence, the name of this lake could well have been associated with the region around it.

If the Colair lake is the same as the *Tramira daha* of the Hathigumpha epigraph, then the confederacy of states or peoples around the lake may be considered to have occupied at least a part of the West Godavari and the

¹ D. C. Sircar, *op. cit.*, p. 209.

² *Indian Antiquary*, Bombay, vol. LV (1926), pp. 145-47. S. Lévi's reading *Pithuda* should be corrected as *Pithurīda*.

³ *Uttaradhyāna Sūtra*, XXI, 1-2; H. Jacobi (editor), *Jaina Sūtras*, part II, p. 168.

⁴ Ptolemy, *Geographike Hyphegesis*, VII, 1, 93.

⁵ *Ibid.*, VII, 1, 15.

⁶ *Ibid.*, VII, 1, 79.

⁷ H. C. Ray Chaudhuri, *Political History of Ancient India* (5th edition), p. 500,

n. 1.

⁸ *IA.*, vol. XLIII, p. 64; *EI.*, vol. XX, p. 85.

⁹ *Mahābhārata* (Poona edition), III, 118, 3-4.

¹⁰ *Imperial Gazetteer of India*, vol. XXVI (Atlas), pl. 44, c. 3.

¹¹ J. F. Fleet (editor), *Corpus Inscriptionum Indicarum*, vol. III, Calcutta, 1888,

p. 6.

¹² *EI.*, vol. VI, p. 6.

Krishna districts. It seems likely that Pithurinda was one of the cities of that confederacy. It may even have been the chief city, since its metropolitan status is perhaps alluded to by Ptolemy and also by the Hathigumpha inscription's description of it as having been founded by a former king or kings.¹

The Hathigumpha inscription states that the above confederacy was in existence for thirteen (or hundred and thirteen? or thirteen hundred?) years and that it had caused great anxiety to the countryside (*janapada*), obviously of the Kalinga Kingdom.

In his eleventh regnal year Khāravela destroyed that league and also Pithurinda,² probably the chief city of the confederacy.³

¹ D. C. Sircar, *op. cit.*, p. 209.

² D. C. Sircar, without any convincing reasons, thinks that Pityndra (Pithurinda) was the metropolis of the Br̥hatphalāyanas, who, he suggests, may have been ruling there as early as the time of Khāravela (D. C. Sircar, *The Successors of the Sātavāhanas in Lower Deccan*, Calcutta, 1939, pp. 46–49).

³ The Hathigumpha epigraph explicitly refers to the destruction of one city of the confederacy, probably because it was the chief one.

DISPOSAL OF THE DEAD AMONG THE MAHISHYAS OF MIDNAPUR

By TARASISH MUKHOPADHYAY

INTRODUCTION

The Mahishyas of Midnapur are regarded as 'clean' sudras. They are served by a class of Brahmans known as Vyasokta Brahmans. Nabasakha castes, like potters, barbers and blacksmiths, are served by the Madhyasreni Brahmans. The Madhyasrenis do not interdine with the Vyasoktas who are regarded by them as lower in rank. The Vyasoktas serve the Mahishyas only and no other caste. By and large, the Mahishyas are engaged in agriculture. Some families have become urbanized and have taken up professions in towns.

The present paper describes their method of disposal of the dead in the villages of Tamluk subdivision in Midnapur. It is based on what was observed and partly gathered by interviews in the villages of Palanda, Tarangakhali, Ghorathakuria, Raghunathpur and Kakharda, which lie at a distance of about five miles from Tamluk to the north. The data were collected in 1964.

CEREMONIES AT HOME

When a death occurs, the family priest is called to perform the *mrita-cāndrīṣṇa* ceremony. A few dry leaves of the jute plant and a very small piece of gold are laid on the mouth of the corpse and a bandage of cloth is tied round the mouth to hold the articles in position. The male member of the family who is to light the funeral pyre is known as *Agnikartā*, or the 'applier of fire'. The priest now takes a long piece of thread and gives it to the *Agnikartā* who holds it at one end while the other end is left in loose contact with the corpse. Sandal paste is besmeared on the forehead of the dead while lac dye is applied to the sole of the feet. A necklace of the sacred basil beads is tied round the neck and garlands of flowers are also used to decorate the dead body. The *Agnikartā* now prepares the *pinda*-offering which consists of a mixture of sun-dried rice, banana, unboiled milk, clarified butter and honey. These are kneaded together and made into five balls. Two of these balls are offered to the dead at home, while the other three are used in the cremation ground.

In the meanwhile, a bier of bamboo, freshly-cut, is prepared for carrying the dead to the cremation ground. This is like a ladder, 6 ft. long and about 2 ft. 6 in. wide. The cross-pieces were seven in number in the case observed, this being an established rule.

The corpse is now carried out of the room and laid on the bier. The corpse is completely covered with a new piece of cloth. Only the kin of the dead and members of the same caste are allowed either to touch or carry the dead to the cremation ground. No other caste may do so. As the bier is lifted from the ground all assembled chant the name of God with the cry, *Bala Hari Hari Bole*, which literally means 'utter the name of God'. This is done thrice. After the bier has been lifted, it is turned round three times completely in a clockwise direction. The head of the corpse points in the direction in which the procession goes and the legs point backwards to the house.

As soon as the corpse is removed from the room an iron nail is struck into the floor where the body lay. Just before the procession moves away from the house, the *Agnikartā* takes a sharp iron implement and cuts a knot with it from the eaves of the house. Perhaps this symbolically signifies that the ties of the dead with the home are cut away for ever. When the procession leaves, a woman belonging to the household goes on sprinkling a mixture of cow-dung in water for some length along the road. This is for purification from the defilement of death. The pot containing the cow-dung solution is thrown away outside the compound of the house. Culinary earthenwares are also thrown away.

The funeral procession is headed by a band of singers who sing *kirtan* songs in accompaniment with a drum called the *khole*. One man in the procession goes on scattering puffed rice and copper coins along the way. A second carries a new earthen pitcher, a large mattock (*kodāl*) and a bamboo basket containing things needed during cremation. Other relatives and neighbours carry logs of wood to the cremation ground. The first man carrying logs must not utter a word until he lays down the load of wood. The logs are chopped into pieces for making the pyre.

There is a cremation ground in the village, one portion of which is used exclusively by the Mahishyas. When the corpse reaches the place, the bier is touched ceremonially on the ground three times and lifted again. Then it is laid finally on the ground. The *Agnikartā* bows down his head and touches the ground with his forehead in salutation and places a copper coin on the ground as a token of seeking permission from Mother Earth to use the place for cremation.

The *Agnikartā* cuts a shallow trench in the ground with three strokes of the mattock. Five kinds of grains are placed in offering in the hole. This is done three times. The pyre is now built up with logs of wood over the shallow trench. In the meanwhile, a man sits beside the dead body with his hand in touch with it. This is done so that 'no evil spirit (*pret*) might take possession of the corpse'.

The corpse is now held in the sitting posture by three men who also loosen all ties of cloth, etc., which might be present in the dress of the corpse. The *Agnikartā* fills a pitcher of water from some neighbouring tank and bathes the dead body with it. Before he draws water from the tank he draws a rough square on the surface of the water with his index finger. A twig of a mango tree is laid on the mouth of the pitcher. A little *ghee* or clarified butter is applied to the corpse and water is sprinkled on it three times with the help of the twig. This is considered to be the act of bathing.

After thus bathing the body, the three balls of *pinda* are now offered. On enquiry, the writer was told that the three are meant for the *ardha-pathik* (half-traveller ?), *pathik* (traveller ?) and the funeral pyre itself.

The corpse is now lifted from the bier and laid on the pyre. The name of Hari is chanted three times with the formula *Bala Hari Hari Bole*. The body is laid without any clothes, with its head to the south, and then covered over with a piece of cloth. In the case of males the body is laid with its ventral side towards the ground. In the case of females the body is laid on its back with its face upwards. The legs are bent in at the knee so as to occupy lesser space on the pyre. Heavy logs are then laid on the corpse.

The *Agnikartā* now lights a bundle of dry jute sticks and circumambulates the pyre in a clockwise direction. Then he touches the mouth of the corpse with fire three times. This ceremony is known as *mukhagni* or applying 'fire to the mouth'. Then the *Agnikartā* applies fire to the pile at its southern end. Now everyone may help in order to set the entire pile fully on fire.

The body is burnt in about three and a half hours. When burning is nearly complete, some clarified butter and pieces of sandalwood are thrown into the flames. The bier is broken up and the bamboo poles are used for raking the fire and finally they also are burnt. The handle of the mattock used for making the trench is detached and left in the cremation ground.

When the cremation is over the *Agnikartā* brings water three times in the pitcher originally used by him for bathing the dead. He pours the water by the side of the pyre but takes care not to extinguish the flames. After pouring water, he places the pitcher behind him and strikes it thrice with an iron scythe without looking at it. The pitcher is not broken but left on the spot. The party now leaves the cremation ground while chanting the name of God with the formula *Bala Hari Hari Bole*.

On reaching home, the members of the party take a bath. The *Agnikartā* puts on a new cloth (*kāchhā*) for wearing. A strip of new cloth is also worn as *uttari* with an iron key. The purpose of using the iron key is to protect the *Agnikartā* from the influence of evil spirits and probably from the dead soul. Before they enter the house, all of them have to touch gold, silver and chew a few dried leaves of the jute or margosa plant. They also warm their palms over a fire lit for the purpose with straw.

From that time onwards, the *Agnikartā* wears no other clothing until the funerary ceremony is over. Up to the end of the third day of burning the body, the kitchen oven is not lighted for cooking since fire is still in the pyre. The members of the dead man's family do not generally eat rice for the first three days. More particularly the *Agnikartā* and his wife, his brothers and brothers' wives never take rice on those three days. Also, until the end of pollution, all members of the family and kinsmen do not take fish, meat, onion, garlic, lentil, etc. The *Agnikartā* has to sleep on the floor without a bed, has to avoid oil or cosmetics. He must not wear shoes nor use a comb for dressing his hair. Sex-relationship is also strictly prohibited during that period.

COOLING THE PYRE (*CITSITLĀNO*)

On the fourth day called *caturthā*, the *Agnikartā*, along with some others preferably of the cremation party, visit the cremation ground. They carry five kinds of grains, namely sesamum, barley, paddy, phaseolus and green gram, known as *pancasasya*, to the cremation ground. They also take a basil plant and a few cotton seeds with them. The blade of the mattock used on the first day is taken along and its handle which was left in the cremation ground on the funeral day is now fitted on the blade.

The *Agnikartā* now pours water on the pyre, after which a few pieces of charred bones are collected from the ashes for immersion into the neighbouring river, which is, for the time being, looked upon as equivalent to the holy Ganga. The remaining charred bones and ashes are collected and kneaded together with mud. Water is added to make the lump fit for modelling a symbolical figure of the deceased. The model when complete takes the figure of a man lying prostrate. It is about 5 ft. long. The head of the figure points to the south. Near the head, a sacred basil (*bābāi* variety) is planted and then cotton and other seeds are sown in the clay forming the body. A pitcher containing water is also kept by its side near the head of the figure. It should be mentioned here that the seeds which are sown are believed to provide the necessities for the dead. For instance, cotton seeds are meant for clothes, paddy for food, sesamum seeds for oil and water to quench his thirst. A hubble-bubble is also placed there for the dead to smoke, if he was used to smoking in life. In the case

of an old man or woman, a walking-stick is also laid nearby. Sometimes, the model is covered with a piece of cloth or a mosquito curtain in order to protect it from the bite of insects and mosquitoes. After this, the *Agnikartā* and his associates return home. But just before leaving the cremation ground all chant *Bala Hari Hari Bole* three times. This function of giving a body and an abode to the deceased's soul is locally known as *citeśilāno* or 'cooling the pyre'.

FUNERARY OFFERINGS ON THE FOURTH DAY

On the fourth day, the Brahman priest comes to offer food (*purak pinda*) to the deceased. It is made of sun-dried rice, banana (*kāntali* variety), unboiled milk, clarified butter and honey. The sacred basil (*bābāi* variety), three earthen pots, three earthen lids, three bamboo sticks, wool, *kuś*-grass (*Eragrostis cynosuroides* R and S) and *benā*-grass (*Andropogon squarrosus*) are also necessary for the ceremony which is performed by the side of a pond or tank.

A mud platform (*bedi*) about 3 ft. square is built for offering food to the deceased. The *Agnikartā* and the officiating priest sit in front of the platform. After mixing a portion of the raw food materials thoroughly, the priest asks the *Agnikartā* to arrange four basil leaves on the platform side by side. He wears the ring made of *kuś*-grass and, afterwards, a little food is placed on each of those four leaf plates with the chanting of *mantras*. The remaining food is thrown into the water. Then two earthen pots containing unboiled milk (*kshir*) and water (*nīr*) are placed beside the mud platform. Those pots are kept in rope slings hanging from the sides of a carrying stick made by bamboo. The two pots are covered by lids so that crows cannot touch it. Here ends the ceremony.

After returning home, the *Agnikartā* makes arrangement for hanging a new earthen pot on a new string carrier. A handful of sweetened puffed rice (*murki*) is placed inside the pot and covered with a lid. Every day, he continues to add a little more *murki*, up to the fifteenth day, when the pollution comes to an end. Here it may be mentioned that married girls who are related to the deceased observe pollution up to the fourth day. On the fifth day they become ritually purified.

PURIFICATION ON THE DAY BEFORE ŚRĀDDHA

One day before the *śrāddha* ceremony some of the functional castes like the Brahman, washerman and barber are called. The priest takes the *Agnikartā* again to the pond in order to offer *pinda*. When the offering is over, the *Agnikartā* gives three strokes to the mud-built platform with his mattock. He collects all the pots, the *benā*-grass and the particular earthen pot where he offered sweetened puffed rice for twelve days. These are all now thrown outside the family compound. A few sesamum seeds are sown in the place where the *benā*-grass had been planted in one corner of the mud platform.

While the *Agnikartā* performs these rituals, the men and women of the deceased's family and the kinsmen get their nails pared by the barber. Hair is cut or the head is shaved according to one's relationship with the deceased. Those superior to the deceased shave their beards, cut hair and pare nails while the junior members have to shave their heads completely. The women only pare their nails. The *Agnikartā* has his head shaved last of all. These performances are done outside the home.

Before going to bathe in the pond everyone anoints his body with a paste of turmeric and mustard oil. For bathing, a new place at the side of

the tank is selected which is not normally used. After bath, the wet clothings are piled up at a place and given to the washerman for ritual washing. Before leaving the place of bathing, the *Agnikartā* and all his family members (lineally and laterally connected with the deceased, excepting married sisters and daughters) have to put on new clothing, new bead necklaces of basil wood and red waist-threads called *ghumsi*. These new clothings are purchased or are presented to the *Agnikartā* by his near relations through marriage.

On returning home, another function called *ghātmārjan* is held at the particular place where the death occurred. The *Agnikartā* sits there either facing the east or south, and the priest sits on his right. As items of offerings, the priest takes the water of the holy Ganga, flowers, paste of sandal-wood, *durbā*-grass, etc., etc., and utters *mantras*, which are repeated after him by the *Agnikartā*. When this is over, the priest sprinkles the sanctified water (*sāntijal*) on the body of all present. A part of it is kept aside for sprinkling all over the family compound for ritual purification. On this day, no cooking is done in the daytime and so uncooked food is served to all.

After sunset, *kirtaniyas* or singers are employed to sing devotional songs in order to please the soul of the deceased. The women members of the house busy themselves in cooking vegetarian food for all kinsmen and relations, including those who had participated in the funeral in the cremation ground.

The *Agnikartā*, however, cooks separately and uses the same earthen pot (*mālsā*) which he had been using since the fourth day. He takes out a portion of the food (*habisyānna*), including sun-dried rice, boiled green banana and potatoes, on a banana leaf placed in a brass plate. With this he proceeds to the bathing ghat and the women of the house accompany him while blowing conch-shells. Standing near the water, the *Agnikartā* calls the deceased's soul by his name and surname and requests him to accept the food which he has brought. Now he makes three balls out of the food and throws them into the water one by one. After this all return home.

The *Agnikartā* sits for dinner with the remnants of the food already offered to the deceased. When he is eating nobody should utter his name nor should he talk to anyone. If any disturbance takes place accidentally, the *Agnikartā* leaves the plate at once. After dinner he takes rest for the *śrāddha* ceremony on the next morning.

THE DAY OF *ŚRĀDDHA*

In the morning, arrangements for the funerary ceremony are made at the particular place where the death occurred. This ceremony has two distinct halves. The first half takes place in the morning (preferably before noon) and is called *caturtha sānti*. It consists of four distinct functions, viz. *Surja-pujā*, *Angaprāyascitta*, *Tilakāncana* and *Baitarani*. The second part is known as *pindadān* or 'ceremonial offering of food and other gifts' in honour of the deceased. This is performed at noon.

The Sun is implored to act as witness to the ceremony and so He is worshipped. The materials required for worshipping are one piece of napkin, $2\frac{1}{2}$ seers of sun-dried rice, ten betel leaves, ten betel-nuts and 25 copper coins. All these articles, of course, go to the priest, Acharya Brahman. He also gets 25 paise as *dakshina*, i.e. a prestige payment for his participation in that function.

The *angaprāyascitta* is performed for purifying the body of the *Agnikartā* for his possible physical violations of the rigours of mourning discipline. The items required for the purpose are one napkin and 27 copper coins. These are due to the officiating priest.

The purpose of offering *tilakāncana*, i.e. black sesamum seeds and a bit of gold, consists in wishing a prolonged stay (as many crores of years as the number of seeds) for the deceased's soul in heaven. Necessary items include a piece of napkin, black sesamum seeds, a copper cup and a piece of gold or Rs.3.82 P. in lieu thereof. Customarily these items go to the Acharya Brahman.

Baitarani is a mythological river of sorrows which is to be crossed by the soul on its journey to the other world. This difficult river, it is believed, can be crossed by the soul with the help of a cow by holding tufts of its tail. Articles required for this function consists of one napkin, 125 copper coins, one small earthen pot, an oil-lamp placed on a lump of cow-dung and an iron nail. These items are given to the Acharya Brahman.

It was, however, observed that in the course of the above-mentioned worshippings, four *dongās*, i.e. platters made of banana stems, are required. In each of them are placed a few sesamum seeds, basil leaves, one betel-nut, *durbā*-grass and a little water. An extra platter is kept separate for the sacred water.

At the outset, the *Agnikartā* takes a bath and, after receiving permission from his elderly relatives, he sits for the ceremony facing the east. The priest sits by his right side. He utters *mantras* and the *Agnikartā* repeats them after him. In this way, worshippings are done one by one and respective items are offered. After each worship, the portion of water in a platter is considered sacred.

After the performance of *homa* or ceremonial invocation of fire by the priest, the *Agnikartā* rubs a bit of clarified butter in his hands and holds them over the fire. This is a token of homage to the Fire-god or *Brahmā*. The priest then prepares the sacred water by collecting water from four platters to a separate one, as mentioned earlier. He sprinkles sacred water on the bodies of all men, women and children present for the ceremonial purification. The remaining water is poured under a fruit tree. When it is over, everyone goes to take a bath. Here it may be mentioned that it is customary for the *Agnikartā* to bathe again. After that, he waits for the second half of the ceremony at noon. He is not permitted to take any food or drink till the entire ceremony comes to an end.

The requisites for the *pindadān* (offerings of uncooked food materials to the deceased) ceremony include the sacred water of the Ganga, two pieces of cloth, three pieces of napkin, twelve betel leaves, fifteen betel-nuts, a little unboiled milk, clarified butter, honey and sugar. Other raw food materials include unboiled rice, sun-dried rice, vegetables, spices and fruits. Items of daily necessities such as bell-metal utensils, beddings, a pair of shoes, an umbrella, etc., are also offered. A chariot made of pith and called *mandir* is offered for the smooth journey of the soul to heaven.

It may be mentioned that certain requirements for the ceremony are customarily prepared by the Acharya Brahman. For example, he makes two varieties of platters, viz. *cātā* or flat ones and *dongā* (a bit hollow receptacles), from banana stems. A total of sixteen of each variety are required to complete the ceremony. The size is about 8 in. in length and 3½ in. in breadth. Certain items made of *kus*-grass are also made by him.

The second part of the ceremony, i.e. *pindadān*, starts positively at noon. The *Agnikartā* and the priest take their respective seats. The oil-lamp is lit. The burning oil-lamp stands as a witness to the occasion since

the lamp represents *Brahmā*, the Fire-god as well. The priest instructs the *Agnikartā* to wear the ring made of *kuś*-grass in both of his fourth fingers (*anāmikā*). Then, as directed by the priest, the *Agnikartā* performs certain ritual formalities to purify the water, flowers, etc. Certain presents, viz. a brass jug, one piece of cloth and a rupee coin, are offered in honour of the family preceptor with *mantras* praying for his blessings. These items are sent to the preceptor. Then the priest worships other gods with chants and offerings. These deities are *Jaggeswar*, *Bāstu*, *Bhuswāmi* and *Gangā*.

Then the *Agnikartā* is made to offer unboiled rice, betel leaves, areca-nuts and a piece of napkin in the name of the deceased. The name and *gotra* or clan name of the *Agnikartā* and the deceased are mentioned at the time of offering. Certain articles as believed to be used by the deceased in heaven are also offered with the sprinkling of sacred water from the platter (kept in front of the *Agnikartā*) and repetition of *mantras* three times.

After the end of these formalities, the *Darbhamaya Brāhmaṇ* (a symbolic concept of Lord Narayana made with seven pieces of *kuś*-grass) is bathed by the priest with the sprinkling of water three times. When bathing is complete, sacred basil leaves anointed with sandalwood paste are placed over the grass image. This image is now worshipped by the priest with offerings. While this is being done, the priest instructs the *Agnikartā* to prepare the *pinda* for the deceased.

Raw food materials, like sun-dried rice, wheat, unboiled milk, clarified butter, honey, sugar and a number of ripe bananas, kept separately in a banana-leaf plate, called *annapātra*, are mixed together into a lump. Out of this kneaded mixture, the *Agnikartā* prepares two balls of *pinda*, one big and the other small. Basil leaves, a few black sesamum seeds, *motok* (made of *kuś*-grass), etc., are also given along with the *pinda* before they are served. Here also the name and *gotra* of the deceased are to be uttered by the *Agnikartā*.

The small ball of *pinda* is made to the *Agnidagdhāra* or God of Fire. It is believed that the *pinda* offered to the *Agnidagdhāra* would satisfy the souls of those ancestors who had no formal cremation nor any funeral ceremony. Some Brahmins hold a different view. They say the *pinda* offered to the *Agnidagdhāra* is meant for those souls of insects, etc., killed in the flames of pyre.

The big-sized ball of *pinda* is then offered to the *pret* or the soul of the deceased. Now, after collecting the portion of food left in the *annapātra*, the *Agnikartā* scatters them on the ground around the *pinda* of the *pret* three times. This is known as *bestan*. From the rest of the food items a separate *pinda* is made and given on the *pinda* offered to the *pret*. This is called *bāsdān-pinda*. A small ring of *kuś*-grass is also offered along with the above articles. It is believed that these scattered food would satisfy other unknown spirits and that they would not disturb the deceased's soul while he is accepting *pinda*. When all the food items have been distributed from the *annapātra*, the latter is turned upside down. It is interesting to note that, at the time of offering *pinda*, the presence of the Acharya Brahman is tactfully avoided by all, so that his spell on the *pindas* might not disturb the soul.

The *Agnikartā* only worships the particular *pinda* he offered to the *pret* (deceased's soul). No other *pinda* is worshipped. The priest goes on reciting *mantras* repeated by the *Agnikartā*. From time to time, flowers are showered on the *pinda* with sprinkling of holy water and unboiled milk. When the worship is over, a pith-made chariot is offered to the deceased's soul. The chariot is about 3 ft. in height and costs Rs.2.50 to Rs.3.00. However, its size and price may vary according to the means of the donor.

Sometimes the chariot is made of stems of the *bend*-grass. All these are made available by the *Mäläkar*, garland-makers. The chariot is to help the soul on his journey to heaven. All the members of the household, who are younger than the deceased, now show respect to the soul by prostrating themselves on the ground. They also touch the feet of the priest for performance of the sacred duty.

In the last phase of the ceremony, the priest reads verses from the *Bhagavad Gītā*. He sprinkles sacred water (*sāntijal*) invoking peace to the *Agnikartā* and all the family members. At the end, the priest is paid his *pranāmī* or payment for his services. The items which were offered to the deceased are shared by the priest and the Acharya Brahman, who assists in the ceremony.

The *Agnikartā* collects all the *pindas* which were offered to the deceased and throws them into the pond. On his way to the pond, he is not allowed to see any one's face. Women go in front by blowing conch-shells and some of the singers may also accompany him.

After immersion of the *pinda*, the *Agnikartā* carries the pith-made chariot to the cremation ground. He is also accompanied by other members of the family. In the cremation ground, the *Agnikartā* salutes the mud-built human figure, while he faces the east. Then he places the pith-made chariot just in front of the head of the model. Members, who accompanied the *Agnikartā*, also salute the clay image of the deceased. By this time, it is dusk and they return home.

Meanwhile, some Brahmans are treated to a feast with fried rice, fruits, sweets and curds. This is called *Brāhmaṇ bhojan*, which is obligatory in a *Śrāddha* ceremony. Brahmans are also paid in cash (*dakṣinā*) for their participation. Next day a feast is also arranged in which fish is taken for the first time since the death occurred. Friends, neighbours and kins participate in the feast. With this feast the *Agnikartā* and other kinsmen break the austerity of the mourning period and begin to lead a normal life as before.

CONCLUSION

This paper describes the disposal of the dead and subsequent ritual practices specially among the Mahishyas of eastern Midnapur. It was observed that in connexion with the death ritual, certain odd numbers, viz. three, five and seven, occur in many instances. For example, at the time of taking the bier, the carriers shout the name of Hari with the formula *Bala Hari Hari Bole* three times. In digging the shallow trench in the cremation ground for constructing the pyre they employ three strokes of the mattock. At the end of the cremation the *Agnikartā* brings water three times in a pitcher for pouring it over the burning pyre, and also strikes the pitcher thrice with an iron scythe. Similarly in closing the kitchen for the first three days; in employing five kinds of food items in the preparation of *pinda*; in offering five kinds of grains (*pancasasya*) over the mud-built human figure at the cremation ground on the fourth day after cremation; in the use of the same again at the time of *Śrāddha*; in constructing the bier with seven cross-pieces; in making the *Darvamaya Brāhmaṇ* with seven pieces of *kus*-grass and so on, the use of the numbers three, five and seven occurs again and again.

The participant castes who act as functionaries and helpers in the rituals of the Mahishyas do so because of their own ritual status as determined in the caste group to which they belong. For instance, the Vyasokta Brahmans who act as the priest of the Mahishyas occupy a lower ritual

status within the Brahman group. Commensality with the higher sub-sects of the local Brahmans is denied to them. So also the Acharyas, a sub-sect of Brahmans who are by tradition helpers in the ritual, occupy an insignificant and unclean position within the caste. The Mahishyas, who are counted as a caste in the lower rungs of the hierarchy, yet despise the Acharyas, an attitude derived from the position occupied by and accorded to the latter by their own castemen. For instance, the Acharyas are believed to be capable of doing harm and casting an 'evil eye' on the offerings made during the ceremony. The position occupied by an officiant group in respect of the caste to which it officiates is, therefore, determined by the status accorded to it by the original caste which the officiant caste belongs to. But in the case of the barber and washerman the position is different. The man who serves the Mahishyas, serves a number of other castes too. Members of certain lower castes, like the Dules, palanquin-bearers, Muchi, leather-workers, Dom, basket-makers, etc., who partake of the feast as *kāngāli* or destitute, usually consider the Mahishyas as higher in the local caste hierarchy than themselves and so they do not hesitate to come.



Human figure in the cremation ground—a photo sketch

RHYTHM IN SANSKRIT SYLLABIC METRES

By AMULYA DHAN MUKHERJI

THE TRADITIONAL MODE OF ANALYSIS

In discussing *Aksaracchanda(s)* or syllabic metres in Sanskrit, writers on Sanskrit prosody are usually content with compiling a list of metres with descriptions of their superficial features and make no attempt practically to explain their structure according to any principles of rhythm. It has always been the practice to catalogue them according to the number of syllables in each line of verse, i.e. in the quarter-stanza, and certain mnemonics have been in use to indicate the sequence of long and short elements in the verse. But these mnemonics have no reference to any principles on which the order of syllables may have been based. Except sometimes in the name, there is no indication of the rhythmic character of a particular metre¹ or of the considerations that may have led to the acceptance of the metrical scheme as the objective correlative of an emotional mood. The various metres are undoubtedly rich in their emotional appeal, and it is obvious to anybody that the appeal is closely connected with the rhythmic characteristics of the metre. But the traditional modes of analysis do not bring out these characteristics at all.

So far as analysis of the metres is concerned, Pingala, perhaps the earliest of the Sanskrit prosodists, lays down that each line of verse is constituted with a certain number of 'feet' (*Gāṇa*), occasionally with the addition of one or two extra longs or shorts. Later prosodists follow Pingala and none of them have promulgated any new theory or principle, though in respect of some metres a few of them have from time to time noted certain features that Pingala had not done. According to the traditional modes of analysis, every foot is a group of three syllables, long or short, and the possible permutations give us eight varieties of feet, viz. molossus (*m*) (---), tribrah (*n*) (◡◡◡), bacchiac (*y*) (◡--), cretic (*r*) (-◡-), antibacchiac (*t*) (---◡), dactyl (*bh*) (-◡◡), amphibrach (*j*) (◡-◡), and anapaest (*s*) (◡◡-). Although Pingala speaks of *Samāni* or trochee (-◡) and *Pramāni* or iambus (◡-), his lead was not followed by later prosodists. As a matter of fact, feet of two syllables or metra¹ of more than three syllables were not recognized by Sanskrit prosodists as units of metre.

ITS SHORTCOMINGS

The weakness of the traditional mode of analysis is that it provides no indication of any principle of rhythm according to which a metre may have been constituted. The component feet in a line of verse, as analysed by older prosodists, are very rarely the same or similar in type. Nor is there apparently any system about the order and grouping of feet in a

¹ 'Metron' (*pl. metra*) = 'measure'. In Greek prosody, it is 'the smallest metrical unit, consisting of a given sequence and number of long and short elements, of a period made up of several such units'. A metron is at times the same as a foot; sometimes it is composed of two feet.

[In my analysis of Sanskrit metres I have found it not merely convenient but also necessary to use terms accepted by writers on Greek and Latin prosody.]

line of verse. The prosodists have, of course, noted the position of the caesura or the caesuras in the longer metres, but have failed to discover any connection between the caesura and any rhythmic scheme according to which the line may have been constituted.

The mechanical practice of simply counting the total number of syllables in a line of verse and regarding the whole line as an assemblage of arbitrarily selected feet, has kept the traditional prosodists blind to even obvious rhythmical features of the simplest patterns of verse. For instance, **MĀNAVAKĀKRIDITAKAM** (- - - - -) is analysed by Pingala as a metre consisting of a dactyl and an antibacchiac followed by a short and a long. Such an analysis does not indicate any rhythmic principle of structure. On the other hand, if one takes the line as consisting of two choriambuses¹ (- - - - , - - - -), that is to say, of four feet, trochaic and iambic alternately, the rhythmic pattern becomes obvious. It is interesting to note that the choriambic character of the metre must have been partially understood by the prosodist Halāyudha who suggested a caesura after the fourth syllable. The alternative title of the metre as given by Gangādāsa, **MĀNAVAKAM**, implies the choriambic rhythm in the sequence of longs and shorts in the very name (- - - -).

Many similar instances might be cited. A verse of eight syllables, of the type --- - - - - - , is classified by Pingala as a **VITĀNA**² (an octosyllabic verse of a miscellaneous type). He fails to notice the rhythmic character of the line which consists of two ionic *a majore* (- - - -) metra. Even such a simple metre as **PAṄCA-CĀMARA** (- - - - - - - - - -) was analysed in *Vṛtta-ratnākara-pariçīṭā* as a metre consisting of an amphibrach, a cretic, another amphibrach, another cretic, a third amphibrach and a longum³ in the order named. But actually the metre consists of only eight iambic feet. This is an extreme instance to show how Sanskrit prosodists were often misled by their obsession that every line of verse must consist of a certain number of trisyllabic feet.⁴

The notion that every metre was to be classified primarily according to the number of syllables in each line of verse, handicapped the traditional prosodists in several ways. First of all, they were unable to perceive the consanguinity between kindred metres. The well-known **VAṄCASTHĀ** (or **VAṄCASTHAVILA**) is a verse of 12 syllables with the sigla - - - - - - - - - - and is supposed to be constituted with an amphibrach, an antibacchiac, another amphibrach and a cretic in succession. But such an analysis gives no idea regarding the basic rhythm of the verse. On the other hand, another popular metre, **RUCIRĀ**, a verse of 13 syllables with the sigla - - - | - - - - - - - - - , is taken by all the prosodists to be a verse constituted with an amphibrach, a dactyl, an anapaest, another amphibrach and a

¹ 'Choriamb' is a metrical unit of 4 syllables, 2 longs and 2 shorts, arranged as - - - - .

*No satisfactory analysis of Sanskrit metres is possible unless feet of 2 syllables like spondee (- -) and pyrrhic (- -) and metra of 4 syllables like dispondee, proceleusomatic (- - - -), choriamb, ionic *a majore* (- - - -), ionic *a minore* (- - - -), paean (a group of 1 long and 3 short syllables), epitrite (a group of 1 short and 3 long syllables) are recognized.*

² **VITĀNA** is, according to Pingala, a metre of 8 syllables, other than the trochaic and the iambic octosyllable.

³ 'Longum' is a long element in the metre. The plural is 'longa'.

⁴ Subsequently, of course, Gangādāsa noted that this particular metre was a doubled form of **PRAMĀNIKĀ**. But **PRAMĀNIKĀ** itself was analysed by both Kedārabhaṭṭa and Gangādāsa as a verse consisting of an amphibrach, a cretic, a short and a long. Only in Pingala's treatise on Prākṛta metres there is a clear perception of the rhythmic character (*Lahū Gurū Nirantara*). The emergence of this conception was very probably influenced by notions derived from Prākṛta metres.

longum, arranged in the order indicated. Apparently, if we follow the traditional analysis, there is little in common between the two metres. As a matter of fact, however, the two metres are basically the same, being two variants of an iambic verse with six feet. In *VĀNGASTHA* there is a trochaic substitution in the third foot, and in *EUCIRĀ* there is tribrahic substitution also in the third foot. It may be noted here that the moric values of an iambus, a trochee and a tribrahic are the same. Similarly, though *ANAVASITĀ* is a metre of 11 syllables and *ACALADHRTI* of 16, they are basically the same as both are verses of 16 morae divisible into measures of four morae each. The sigla of *ACALADHRTI* is the simplest possible, and Gangādāsa has rightly noted that it consists of just 16 short syllables. But he cannot conceive of any uniform measures with which the verse is constituted. If he could analyse the verse into metra with moric equivalence, he might have noticed the basic similarity between *ACALADHRTI* and *ANAVASITĀ* (—, —, —, —). Both are basically moric metres and it is moric equivalence that constitutes the principle of structure. The traditional analysis of *ANAVASITĀ* into a tribrahic, a bacchiac and a dactyl followed by two longs, is just a superficial description that has no reference to the basic principle of its structure.

AFFINITIES BETWEEN VARIOUS METRES

Because of the same obsession that in analysis of metres the only features that mattered were the length of the line and the order in which the longs and shorts were positioned, the traditional prosodists failed to notice the rhythmical affinities between metres closely connected or having the same affiliations. For instance, *ÇALINI* (—|—, —, —) is described by them as a metre of 11 syllables in which a molossus is followed by two antibacchiacs and two longa with a caesura after the fourth syllable. Not only have they failed to indicate any rhythmic principles involved in the structure of the metre, but they have also failed to notice the close affinity between *ÇALINI* and *MANDÄKRÄNTA* so far as structure is concerned. *MANDÄKRÄNTA* (—|—, —, —, —, —, —) is described by them as an altogether different metre with 17 syllables to the line in which the successive feet are a molossus, a dactyl, a tribrahic, two antibacchiacs followed by two longa with caesuras after the fourth and the tenth syllables. Described thus, *MANDÄKRÄNTA* appears to have nothing in common with *ÇALINI*. Yet these two metres are intimately related to each other in their structure and rhythm. *ÇALINI* is a bipartite metre with a caesura¹ between its two *cola*², the 'opening' and the 'cadence'³, the opening being a dispondee (—) and the cadence—a popular type in Sanskrit prosody—being a sequence in which two creticas are followed by a concluding longum (—, —, —). *MANDÄKRÄNTA* is a tripartite verse with three *cola*, easily distinguishable by the position of the two caesuras, of which the first and the third are exactly the same as the opening and the cadence in *ÇALINI*. The general rhythmic effect in both the metres is therefore practically the same. Evidently *MANDÄKRÄNTA*, a metre of later origin, is an enlargement of an anterior type, *ÇALINI*, by insertion of an extra colon between the opening and the cadence: thus a comparatively

¹ 'Caesura' is a perceptible break in the metrical line, where a word-ending is expected.

² A colon (*pl. cola*) is a shorter entity than the line, but is nevertheless long enough (about eight elements) to possess a definite character as a metrical entity.

³ 'The opening' and the 'cadence' are respectively the first and the last component of a metrical line.

simpler bipartite metre is elaborated into a more complex, more ornate and a more subtly evocative metre.

It may be observed in this connection that the colon (u u u u u -) inserted in the **MANDĀKRĀNTĀ** to constitute the second component of this composite metre is a well-known metrical group in Sanskrit, and is a component of metres like **HARINI** (u u u u - | --- | u - u u -) where it is the first colon, **HĀMSI** (--- | u u u u u -) where it is the second colon, and **MEGHAVISPHŪRJITA** (--- | u u u u u - | u - u -) where also it is the second colon. It may also be mentioned here that the first and the last cola of **MANDĀKRĀNTĀ** are also well known as components of standard Sanskrit metres. The first colon of **MANDĀKRĀNTĀ** is a popular opening and is the same as the first colon in **JALADHARAMĀLA** (--- | u u u u -), **BHRAMARAVILASITĀ** (--- | u u u u u -), **MATTA-MAYŪRA** (--- | u u u u u -), **MATTA** (--- | u u u u -), **MADHYAKṢĀMA** (--- | u u u u u | ---), **VĀTORMI** (--- | u u u u -), **VIDYUNMĀLA** (--- | ---); it is also the same as the second colon in **HARIÑI** and the last colon in **MADHYAKṢĀMA** and **VIDYUNMĀLA**. The last colon of **MANDĀKRĀNTĀ** is a popular cadence and is the same as the last colon in **MĀLINI** (u u u u u - | u - u -), **MEGHAVISPHŪRJITA**, **VAIÇVADEVI** (--- | u u u -) and **SRAGDHARA** (--- u - | u u u u - | u - u -). It may be remarked in this connection that later on, as noted in *Chandomanjari* and *Vṛtta-ratnākara-pariçīṭa*, certain metres like **HARIÑI** and **BHĀRAKRĀNTĀ**, which must be considered variants of **MANDĀKRĀNTĀ**, came into vogue. In these the first two cola are the same as in **MANDĀKRĀNTĀ**, and the last colon, constituted on the same principle as the last colon in **MANDĀKRĀNTĀ**, exploits respectively an antibacchiac and an amphibrach instead of a cretic: the last colon in **HARIÑI** being ---, ---, - and that in **BHĀRAKRĀNTĀ** being ---, ---, -.

Pursuing our analysis in this manner we can easily find that **MANDĀKRĀNTĀ** is only a variant of **HARIÑI**¹, being formed by transposing the first two cola and slightly varying the cadence of the latter. But this obvious kinship between the two metres is altogether obscured in the description of **HARIÑI** given by Pingala and his followers who describe it as a metre in which the successive feet are a tribrach, an anapaest, a molos-sus, a cretic and another anapaest followed by a short and a long. A description of this type could only create the impression that a line of verse in Sanskrit was only a medley of feet arranged arbitrarily without consideration of any sort of rhythmic principles and with nothing but caprice to account for its inception. Surely such a proposition could not satisfy any inquisitive mind.

There is affinity of a different kind between certain metres. Although **SRAGDHARA** and **MANDĀKRĀNTĀ** metres differ from each other in many respects, yet the structural features of both appear to be the same. Both are composite metres constituted with three cola. The first colon in each has a very slow rhythm, being composed, entirely or almost entirely, of a number of longs in succession. The second colon in each has a quick rhythm, being composed, almost entirely, of a number of short syllables in succession. The rhythm of the second colon is thus antiphonal to that of the first. The third colon has a waved rhythm, in which the motifs of the first and the second cola are synthetized, and thus it equilibrates the whole structure. This is one of the basic principles of rhythmic structure

¹ It is difficult to say which of the two metres (**HARIÑI** and **MANDĀKRĀNTĀ**) came into vogue earlier. From Pingala's list it might be presumed that it was **HARIÑI**.

in Sanskrit prosody, and it is illustrated in the longer metres like PRAHARSINI (---| u u u | u - - - -), BHUJAṄGAVIJṄMBHITA (- - - - - | u u u u u u u - | u - - - -), MEGHAVISPጀRJITA, SUVADANA (- - - - - | u u u u u u - | --- u u -), HARIጀI, etc.

A POSSIBLE MISTAKE

But we must be very careful to avoid certain possible mistakes in this connection. In any analytical study of Sanskrit metres when we seek for basic rhythmic principles, we must not imagine the existence of laws which were not there actually and had nothing to do with the constitution of the various Sanskrit metres. We can guard against such errors only by careful historical study and comparison between allied types of metre.* Let us, for instance, take ÇARDŪLAVIKRIDITA. It is a metre with 19 syllables to the line and the metrical scheme is --- u u - - u u u - | --- u - - - . One may be tempted to describe it as a verse of 30 morae to the line, taking two shorts as equivalent to one long, and analyse it thus :

$$\begin{array}{c} \text{--- u u, } - u - u u u * \text{--- u, } - u - \\ = \quad \quad \quad 8 + 8 * 7 + 7 = 16 + 14. \end{array}$$

Such an analysis would be acceptable to one well acquainted with the verse-types and metrical principles current in the various Indian vernaculars.

There are, however, several difficulties about our accepting this analysis. First of all, it is doubtful whether the principle of moric equivalence as the basis of metrical structure was recognized at the time when this metre came into vogue. Secondly, this analysis does not take into account the caesura which occurs after the twelfth syllable. According to the proposed analysis the caesura cuts sharply across the rhythm after the first syllable in the second metrical group. This in itself is not perhaps an insuperable objection, for, not only in the classical languages like Old Greek and Latin but also in a language like English and even in an Indian vernacular like Bengali, the caesura or the sense-pause may cut across a metrical group, i.e. a foot or a measure. Analysis of a line of verse into constituent feet or measures is only meant to indicate the pattern followed in the weaving of the verse, and the completion of a foot does not necessarily imply a breath-pause or a sense-pause. But in Sanskrit the 'yati', though usually translated by the term 'caesura', is actually a diaeresis¹. It does not mark a break within a metron or a foot, it marks the break between the constituent units of the verse, that is between the metra or the cola that may be considered components of a period² or of an asynarteton³. Thirdly, the proposed analysis fails to indicate the obvious affinities between ÇARDŪLAVIKRIDITA and closely related metres like ÇARDŪLA and ÇARDŪLALALITA. These two are metres of 18 syllables in which the first 13 syllables have the same quantities as the corresponding syllables in ÇARDŪLAVIKRIDITA while the scheme of quantities in the last 5 syllables is slightly different from that in ÇARDŪLAVIKRIDITA, the metrical scheme for ÇARDŪLA being --- u u - - u u u - | - - - - and that for ÇARDŪLALALITA being --- u u - - u u u - | --- u u - . If we follow any scheme of division of

¹ 'Diaeresis' means a break *between* two metra (or feet) in a line, where a word-ending is demanded or recommended. Strictly speaking, a caesura means a break *within* a metron.

² A 'period' is practically equivalent to a 'line' of verse, marked off from the next by an emphatic pause.

³ An 'asynarteton' is a verse consisting of two or more metrical sequences which follow one another without a pause, but are separated by diaeresis.

these verses into feet, according to the rules of moric equivalence, we cannot discover any satisfactory formula to establish a kinship between these types. But if we analyse *gĀRDŪLAVIKEIDITA* into two members of 12 and 7 syllables respectively, marked off by the 'yati', we find that the first member is identical with the first member in *gĀRDŪLA* and in *gĀRDŪLLALITA*. This is the feature common to the three types and indicates the rhythmic quality common in them, as suggested in the very names of these metres.

METRICAL TRADITION IN OLD ARYAN

Theoretically, according to the laws of permutation, thousands and thousands of verse-types are possible by variously arranging longs and shorts in lines (or, prosodically speaking, periods) which may be of any length between 2 syllables and 30 syllables. Actually there is no upper limit prescribed for the length of prosodic lines. Yet as a matter of fact only a few hundred of the possible types have actually been in use, and of these again only about 50 may be said to have been popular and regularly used by poets. These preferences surely indicate certain basic rhythmic principles which must have been operative all the time but were never defined by prosodists earlier.

In order to understand these principles it is very necessary to study the evolution of Sanskrit metres on historical principles, to take into account the metrical tradition in the old Aryan languages. Sanskrit metres evolved out of older metres used in Vedic. The Vedic metres were either basically the same as or modifications of metres used in the various languages and dialects, derived from primitive Indo-European and spoken in ancient times over the vast area extending from South-Eastern Europe to Mesopotamia. These were the regions where the cultural tradition of the old Aryan races prevailed for centuries and influenced the arts and languages of the land. Metre is ultimately derived out of melody, being a simpler form, denuded of the complexities of music and adapted to the spoken, as distinguished from the chanted, form of rhythmic composition, i.e. verse. Though verse developed later independently of music, it must have been in the earlier stages close to music and runs parallel to melodic types. Even later on metrical composition retained many of the basic features of the melody from which it was derived. The metrical sequences, groupings and many other features of metrical composition in the old Aryan languages can be explained only by referring to the melodic origins of the metres.

The various links in the chain of development of Aryan metres are extremely difficult to trace as the necessary evidences and the materials for a thorough study are scarcely available at present. Still from what are available now an attempt at reconstructing the history of this evolution could be made.

Of the languages in the Aryan or Indo-Iranian group, the oldest, of which we have any specimens, are probably those of the Rg-Veda and of the Avesta. A comparative study of the various metres used in the Avesta and the Rg-Veda would give us some notions about the old Indo-Iranian metres—of the principles of their structure and their rhythmic features. The same features are present in many of the most important Old Greek and classical Sanskrit metres.

It has been noted that metre in the *Gatha(s)* or chants, contained in the earlier section of the Avesta, is extremely elementary in character, depending solely on the numbering of syllables in particular verses and the placing of the caesura. There is a total absence of any discoverable rhythm based

either on accent or quantity. In fact metre in the *Gatha(s)* represents a stage in the evolution of Aryan verse-rhythm when metrical features were less defined and had not hardened into the stereotyped forms of a later period. In the later Avesta, however, verse appears to be regulated by newer principles. Metre becomes simpler and practically uniform, mainly consisting of eight-syllabled lines. This has almost always been the line along which metre has developed. From the amorphous to the shapely, from the flexible to the rigid, from the fortuitous to the planned—such has been the course of progress.

But even the metres in the earlier section of the Avesta provide interesting clues for the study of Indo-Iranian metres. The *Gatha(s)* were originally chants and the rhythm must have been based on musical features of which we have no adequate knowledge today. But even the skeletons of some of the *Gatha* metres that have come down to us indicate some of the outstanding characteristics of early Indo-Iranian metres.

These *Gatha(s)* are composed in stanzas of 3, 4 or 5 lines, rarely of 6 lines, as the hymns of the Rg-Veda. Each line is composed of a number of syllables, usually 11 in number. Less frequently, the number of syllables to the line is 8, 12, 14 or 16, going up to 19 in the extended lines. More interesting is the feature that each line is constituted with two or three components, each component consisting normally of either 4 or 7 syllables; less frequently, of 3, 5 or 9 syllables. The components are marked off from each other by caesuras between them.

BASIC FEATURES OF INDO-IRANIAN METRES

This will give us some ideas regarding the basic features of Indo-Iranian metres, many of which are found also in the syllabic metres of classical Sanskrit. The more prominent of these features are the following:

(a) The basic unit of metrical composition is the line, or, more correctly, a period, i.e. a rhythmic sequence with a fixed syllabic length.

A period is divided from the next by an emphatic break or pause. A number of periods, usually identical in length and metrical features, constitute a stanza.

[The quantities of particular syllables in the line are not rigidly fixed in the earlier stages of metrical evolution, but become practically fixed later on.]

(b) Each line consists of two or three members, distinguishable from one another by the occurrence of caesuras. These members are metra or cola with their own metrical features. They are referred to as the 'opening' and the 'cadence', or (when the number of members is three) as the 'opening', the 'break' and the 'cadence'.

Though the syllabic length of a metron or a colon may be 3 or 4 or 5 or 7 or 9, the commonest opening is a metron of 4 syllables and the commonest cadence is a colon of 7 syllables. The 'break' is usually a 'foot' of 2 or 3 syllables, and often marks or introduces a change in the rhythmic pattern. On examination it will be found that the colon of 7 syllables is often composed of two metra of 3 and 4 syllables and the colon of 9 syllables of two metra of 5 and 4 syllables. The metron of 5 syllables could be further analysed into feet of 3 and 2 syllables.

These could be illustrated by referring to some of the well-known metres in the Avesta and the Rg-Veda. One of the most frequently used metres in the Avesta is based on the line of 11 syllables, divisible into two members of 4 and 7 syllables. These two, as has been already stated, are respectively the most popular 'opening' and the most popular 'cadence'

in Sanskrit also. The line of 11 syllables in the Avesta has its parallel in the TRISTUBH verse of Rg-Veda, which is also divisible into two members of 4 and 7 syllables. The second member of a TRISTUBH verse is further divisible into a 'break', a foot of 3 or 2 syllables, and a 'cadence', a metron of 4 or 5 syllables. The same features are found in the popular INDRAVAJRA (---~, -~~, -~--~) and UPENDRAVAJRA (~--~, -~~, -~--~) metres of classical Sanskrit. It is to be noted that the quantities of most of the syllables in the Iranian prototype are not fixed, but gradually these tend to be more and more rigid in the corresponding verse-forms in Vedic and in classical Sanskrit. This rigidity is less pronounced in the Vedic forms than in those current in Sanskrit at a later period. These changes may have been caused by the gradual erosion of the accompanying musical features of the original types and the consequent dependence for rhythmical effect upon quantitative sequence as verse came to be spoken rather than chanted.

Another illustration could be provided by comparing verses of 12 syllables in Old Iranian, in Vedic and in classical Sanskrit. In the Avesta (for instance, in the sixth *Gatha*) we have a verse of 12 syllables composed of two cola of 7 and 5 syllables. The Vedic metre, JAGATI, is also a verse of 12 syllables, divisible into cola of 7 and 5 syllables. The two standard metrical schemes of JAGATI are (a) ~--~, ~--|---~ and (b) ~--~, ~--|---~. Out of the second type as outlined above there developed, by the process of fixation of quantities of the ancipitia¹, one of the earliest and best known of classical Sanskrit metres, viz. VAÑGASTHA, with its metrical scheme ~---~--- and its characteristic iambic rhythm with a trochaic variation in the middle.

As has been already observed, metre in the later Avesta is very much simpler and practically uniform. This change may have been due not only to the erosion of accompanying musical features but also to the influence of other popular metrical systems. Be that as it may, in the later Avesta metre consists of octosyllabic verses, rarely lengthened into verses of 12 syllables. The only variety is in the length of the stanza, which may contain 3, 4 or 5 lines. This octosyllabic verse of the later Avesta corresponds to similar types in the Rg-Veda, the GAYATRI and the ANUŠTUBH, which ultimately developed into the standard metre of classical Sanskrit, the GLOKA. As is well known, it is on the pattern of the GLOKA that popular metrical types in the various Indian languages were constituted later on. This process of parallel development between later Indian and later Avestan metres is exceedingly interesting to any student of comparative prosody.

SIMILARITY BETWEEN INDO-IRANIAN AND OLD GREEK METRES

It may be noted in this connection that these popular verse-types in the Avesta and in the Rg-Veda are very similar to certain metrical types in Old Greek poetry. The Sapphic hendecasyllable (~--~, -~~, -~--) has the same structure as Sanskrit INDRAVAJRA and its Vedic and Iranian prototypes, and the quantitative sequence is practically the same as in INDRAVAJRA with the variation that the quantities of the second and third syllables in the Sapphic verse are interchanged in INDRAVAJRA. The Sapphic verse has uniformly a trochaic rhythm whereas in INDRAVAJRA the rhythm is iambic in the first metron and trochaic in the last, the break

¹ 'Anceps' (*pl. ancipitia*) means 'space for either one short or one long syllable in a metrical unit'.

providing a change in the pattern and introducing a delightful variety. Both INDRAVAJRA and the Sapphic hendecasyllable may be presumed to have developed from the older verse-types of 11 syllables, of which the oldest extant specimens are found in the hymns of the Rg-Veda and the *Gatha(s)* of the Avesta. It may be observed in this connection that the Sapphic hendecasyllable and its variant, the Alcaic hendecasyllable, ($\text{U}--\text{U}-\text{U}-\text{U}$), are classified by Greek prosodists as \textcircumflex Eolic metres—metres with special features, supposed to belong to a metrical tradition associated with Lesbos, an island very near the coast of Asia Minor. These are lyric metres introduced at a later period into Greek by writers who composed in the \textcircumflex Eolic dialect current in the north-western part of Asia Minor. They may reasonably be supposed to continue a lyric tradition prevailing in Asia Minor and the neighbouring regions through which the current of old Aryan arts and culture swept on to Iran and India.

Another of these *Æolic* metres is the *Glyconic* (υ υ-υ υ-υ), considered sometimes the basic *Æolic* metre. Later on it was modified variously and exploited by Sappho, Alcaeus, and even by the tragic dramatists of Greece. The *Glyconic* is a metre of 8 syllables, composed of two metra of 4 syllables each; the opening is loosely trochaic and the cadence is iambic. It corresponds to the octosyllabic verse of the later Avesta and also to the octosyllabic verse of the Rg-Veda where also the cadence constituted by the last 4 syllables has a definitely iambic rhythm. At least one variety of the popular Sanskrit metre, the *CLOKA*, corresponds to the *Glyconic*. That the *Glyconic* was an imported metre in Greek may be concluded from the fact that the metre is named after Glycon, a poet of unknown date and place. Probably he belonged to the same region as Sappho and Alcaeus, who accepted the *Glyconic* as the basis for many of their metrical innovations.

There are other parallels between Sanskrit and Old Greek metres from which it may be concluded that many of the metres in both the languages are variants of certain older metres from which they have developed. Homer's dactylic hexameter has its counterpart in Sanskrit DODHAKA ($\text{--} \text{u} \text{--} \text{u} \text{--} \text{u} \text{--}$) which may be considered to be a shortened (tetrametric) form of the Homeric hexameter ($\text{--} \text{u} \text{u} | \text{--} \text{u} \text{u} | \text{--} \text{u} \text{u} | \text{--} \text{u} \text{u} | \text{--}$). The popular iambic trimeter, the metre of Greek tragic dialogue, corresponds in one of its standard forms ($\text{u} \text{--} \text{u} | \text{u} \text{--} \text{u} | \text{u} \text{--} \text{u}$) to one type of PANCA-CAMARA in Sanskrit. A modified form of the iambic trimeter, known as the Choliambic or Scazon ($\text{u} \text{--}, \text{u} \text{--} | \text{u} \text{--}, \text{u} \text{--} | \text{u} \text{--}, \text{u} \text{--}$), which permits spondaic variations in the first and third feet and reverses the rhythm in the last foot by turning it into a trochee or spondee, has its counterpart in Sanskrit VANCASTHA ($\text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}$), an iambic verse of six feet, where the rhythm is reversed in the third foot by a trochaic substitution, and in INDRAVANÇA ($\text{--}, \text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}, \text{u} \text{--}$), another iambic verse of six feet, where a spondee and a trochee are substituted respectively in the first foot and in the third. The trochaic tetrameter of Greek corresponds to TUNAKA ($\text{u} \text{--}, \text{u} \text{--} | \text{u} \text{--}, \text{u} \text{--}$), anapaestic tetrameter to TOTAKA ($\text{u} \text{u} \text{--}, \text{u} \text{u} \text{--}, \text{u} \text{u} \text{--}, \text{u} \text{u} \text{--}$). The 'pherecratean' ($\text{u} \text{u} \text{--} \text{u} \text{--}$) in one of its possible forms corresponds to MADALEKHA ($\text{---} \text{u} \text{--} \text{u} \text{--}$). Ionic verses, of both *a maiore* and *a minore* types, like the dimeters $\text{---} \text{u} \text{u} \text{--} \text{u} \text{u}$ and $\text{u} \text{u} \text{--} \text{u} \text{u} \text{--}$, correspond to certain forms of VITANA. The Phalaean hendecasyllable, in the form adopted by Catullus and Martial, is the same as the even line in BHADRA-VIRAT ($\text{---} \text{u}, \text{u} \text{u} \text{--}, \text{u} \text{u} \text{--}$). Even the complex Galliambic, reproducing the peculiar rhythm of the chants in the worship of

Cybele in Asia Minor, with the metrical scheme $\text{u}\text{u}\text{-}, \text{u}\text{-}\text{u}, \text{-}\text{u}, \text{u}\text{u}\text{-}, \text{u}\text{u}\text{u}\text{u}, \text{-}$, has practically the same rhythm as VARA-YUVATI ($\text{-}\text{u}\text{u}\text{-}\text{u}\text{-}\text{u}\text{u}\text{u}\text{u}\text{u}\text{u}\text{-}$), for the metrical scheme of VARA-YUVATI is easily obtained by shifting the eleventh syllable of Galliambic to the commencement of the metre. It may be noted that Pingala classifies VARA-YUVATI as a Gāthā metre, i.e. a metre for chants.

All these resemblances between Old Greek and Sanskrit metres could not be altogether fortuitous.

[It is to be noted that the Sanskrit metres represent a more hardened form than the corresponding Old Greek metres. Evidently the classical Sanskrit metres belong to a later stage in metrical evolution.]

PRINCIPLES OF METRICAL STRUCTURE IN SANSKRIT

After these considerations we might proceed to enunciate certain principles according to which syllabic metres in Sanskrit are constituted:

(A) These metres are, like the Old Greek and Latin metres, quantitative and are based on the rhythm or 'flow' determined by the succession of long and short elements.

(B) Each structural unit or stanza is divided by pauses into 'periods' (corresponding to lines in the accepted texts) which are the basic units of metrical composition. A period is marked off from the next by an emphatic pause.

(C) Longer periods admit shorter pauses ('caesura' or 'diaeresis', as the case may be) which divide a period or line into 'cola' or constituent parts or members.

(D) The succession of longs and shorts in a period or in a 'colon' is regulated according to a metrical scheme corresponding to the emotional complex it symbolizes. There are many standard schemes of metrical succession which are variously exploited in the construction of verse-types.

(E) The scheme might be made evident by grouping of the syllables in a period into 'metra', the smaller units that go to make up a period.

(F) Occasionally it is the 'foot', a group smaller than the metron, that serves as the minimal unit, two feet at times constituting a metron or 'dipody'.

(G) Each metron or foot consists of several (2 to 5) short or long syllables arranged according to a certain pattern and, as such, possesses a certain rhythmic character.

(H) The metra or the feet in a line or in a colon are sometimes exactly of the same pattern, but not always. The dominant type is often substituted by another similar but not the same; or the various feet or metra are arranged according to a rhythmic idea.

It is not always the principle of regularity but often that of agreeable variety (as in music), alongside or even within regularity, that determines the metrical sequence.

(I) There are many devices by which this variety may be obtained. Among them are:

(i) *Anaclisis* (the process whereby a short element changes its place with an adjacent long element).

We have anaclisis in VĀNGASTHĀ ($\text{u}\text{-}, \text{u}\text{-}, \text{-}\text{u}, \text{u}\text{-}, \text{u}\text{-}, \text{u}\text{-}$), a metre with an iambic rhythm, in which the short and the long in the third foot interchange places. So also in PRAMITAKṢĀRA ($\text{u}\text{u}\text{-}, \text{u}\text{u}\text{-}, \text{u}\text{u}\text{-}, \text{u}\text{u}\text{-}$), an anapaestic metre, there is anaclisis in the second foot.

(ii) *Resolution* (substitution of two short syllables for a longum). In TAMARASA ($\text{u u u u}, -\text{u u}, -\text{u u}, -\text{-}$), a variant of DODHAKA ($-\text{u u}, -\text{u u}, -\text{u u}, -\text{-}$), the opening longum of the latter is resolved into two shorts.

Sometimes there is also *integration* of two shorts into a longum.

(iii) *Substitution*, which may be based on different rhythmic principles:

(a) *Moric equivalence*:

According to this principle, a spondee, a dactyl, an amphibrach, an anapaest are co-equal; so also an iambus, a trochee, a tribrach are co-equal.

It should be noticed that where longer sequences are involved the moric equivalence may not be exactly arithmetical. After all, the moric value of a longum is only *approximately* double that of a short. So in a MANDÄKRÄNTÄ the first colon, a dispondee ($---$), is *felt* to be equivalent in quantity to the second colon (u u u u u -).

(b) *Similarity*:

According to this principle, feet with the same number of syllables may be substituted for one another, if this is required for purposes of rhythm. So in LALITÄ, an iambic metre essentially ($- \text{, u -}, \text{u u}, \text{u -}, \text{u -}, \text{u -}$), a spondee is substituted in the first foot and a pyrrhic in the third foot. This is done to modulate the rhythm from 'slow' at the beginning to 'quick' at the 'break' in the middle.

(iv) *Acephaly* (the lack of one element at the beginning of a metre).

BHADRIKÄ ($\text{u u}, \text{u u u}, \text{u -}, \text{u -}, \text{u -}$) might be looked upon as an acephalous form of an iambic verse with five feet, the second foot being equivalent to an iambus.

(v) *Anacrusis* (an extra syllable at the beginning, before the basic pattern).

(vi) *Syncopation* (dropping of an element; particularly common at the close of a colon).

Both anacrusis and syncopation are illustrated in HARIÑAPLUTA where the even lines ($\text{u u u -}, \text{u u -}, \text{u u -}, \text{u -}$) are anapaestic tetrameters with an extra syllable at the beginning, which drop a short syllable in the last foot.

Catalexis is one type of syncopation and means the suppression of a final element before a pause. TŪNAKA is a trochaic metre with catalexis.

(J) Variety is often meant to secure an inversion of the rhythmic flow about the middle of a period where the 'break' occurs—a period having as a rule two or three members, the 'opening' and 'the cadence', or the 'opening' and the 'break' and 'the cadence'. The cadence is generally the member that indicates the basic rhythmic quality of the line. The rhythm is often slowed down at the end.

(K) The last syllable of a line or a colon is almost invariably long or lengthened, except when the rhythm is purely moric.

(L) An extra longum is often added at the end of a line or a colon to round off the metrical scheme by elongation.

METRICAL NAMES AND FEATURES

In this connection it may be interesting to notice that the names of the various metres frequently indicate not merely the general rhythmic

quality but also provide a clue to the most important feature of the rhythmic structure. Thus **MANDĀKRĀNTĀ** (*lit.* slow-stepping) indicates not merely the general rhythmic effect but also the structural formula for the most important of its constituents, the opening colon, by the very scheme of quantities in the name itself (---). It is the same with metres like **PRAMITĀKṢĀRA** (beginning $\sim\sim\sim\sim$), **KALAHĀNSA** (beginning $\sim\sim\sim\sim$), **KUSUMVICITRĀ** (beginning $\sim\sim\sim\sim\sim$), etc. At times the rhythm of the cadence is considered the more important and so the quantitative scheme in the name of the metre indicates the same in the cadence. It is so in **INDRAVAJRĀ** (ending $\sim\sim\sim$), **MAÑJUBHĀŠINI** (ending $\sim\sim\sim\sim$), **BHRAMARA-VILASITĀ** (ending $\sim\sim\sim\sim\sim\sim$), **ÇĀRDŪLAVIKRĪDITAM** (ending $\sim\sim\sim\sim\sim$), **MAHĀMĀLIKA** (ending $\sim\sim\sim\sim$), etc. Sometimes the basic foot is indicated in the quantitative scheme in the name as in **DODHAKA** ($\sim\sim$), **SEAGVINI** ($\sim\sim$). At times, of course, it is a poetic description of the structural feature as in **TANUMADHYĀ** (slim-waisted) ($\sim\sim\sim\sim$), **DRUTAVILAMBITA** (quick and slow) ($\sim\sim\sim\sim$, $\sim\sim\sim\sim$, $\sim\sim\sim\sim$, $\sim\sim\sim\sim$), **MADHYAKṢĀMĀ** (slender-waisted) ($\sim\sim\sim| \sim\sim\sim\sim\sim\sim | \sim\sim\sim\sim$) etc.

RECLASSIFICATION OF SANSKRIT SYLLABIC METRES— STANDARD SEQUENCES

We may now proceed to analyse the structure of the principal Sanskrit syllabic metres and classify them in accordance with the rhythmic principles already enunciated.

At the outset we have to remember that most of the Sanskrit metres have a tripartite structure, being composed of an 'opening', a 'break', and a 'cadence'. The 'break', where it occurs, is a bisyllabic or trisyllabic foot, and the 'opening' as well as the 'cadence' is either a metron or a colon with a fixed recognized metrical sequence.

Some of these standard sequences are listed below :

Metrical sequences of 4 syllables—

- (A) Dispondee (---).
- (B) Iambic metron ($\sim\sim\sim$).
- (C) Trochaic metron ($\sim\sim\sim$).

Metrical sequences of 5 syllables—

- (P) Dochmiac ($\sim\sim\sim\sim$).

Metrical sequences of 6 syllables—

- (X) $\sim\sim\sim\sim$, $\sim\sim\sim$ (tribrach + anapaest).
- (XX) $\sim\sim\sim\sim$, $\sim\sim\sim$ (dactyl + tribrach) [Reverse of 'X'].
- (Y) $\sim\sim\sim\sim$, $\sim\sim\sim$ (bacchiac + molossus) [The contrary of 'XX'].
- (Z) $\sim\sim\sim\sim$, $\sim\sim\sim$ (three-foot iambic sequence).
- (ZZ) $\sim\sim\sim\sim\sim\sim$ (spondee + pyrrhic + iamb) [The shorts in 'Z' are here all positioned in the middle].

Metrical sequences of 7 syllables [These are the most frequently used sequences]—

- (α) $\sim\sim\sim\sim\sim\sim\sim$ (Two tribrachs + 1 longum).
- (β) $\sim\sim\sim\sim\sim\sim\sim$ (Two amphibrachs + 1 longum).
- (γ) $\sim\sim\sim\sim\sim\sim\sim$ (Two creticas + 1 longum).
- (γγ) $\sim\sim\sim\sim\sim\sim\sim$ (Two antibacchiacs + 1 longum) (obtained from 'γ' by anaclasis).
- (Δ) $\sim\sim\sim\sim\sim\sim\sim$ (Three iambuses + 1 longum) (Z + 1 longum).
- (θ) $\sim\sim\sim\sim\sim\sim\sim$ (molossus + cretic + 1 longum) (slightly different from 'γ').

MAIN GROUPS

Sanskrit metres could be divided into two main groups—simple and composite. Simple metres are based on periods consisting of a number of metra or feet. Composite metres consist of two or three members, each of which is either a metron or a colon. These members are separated from one another by diaereses and their arrangement conforms to a certain rhythmic idea. They correspond to asynarteta in Greek prosody.

SIMPLE METRES

We take up the simpler metres for analysis, at first. Generally speaking, each is based upon the recurrence of one particular foot, but strict regularity is not usual, variety is almost always introduced by some device or other.

The Iambic Group

The six-foot Iambic line (corresponding to Latin 'Iambic senarius') is the basic type in the group. It is modified in the various standard metres by the introduction of variations. Pure Iambic senarius (one form of PĀNCACĀMARA) is not found until a very much later date in the history of evolution of Indo-Aryan prosody. Mechanical regularity was disfavoured in the earlier stages.

(1) The oldest type in the Iambic group is probably VAṄCASTHĀ, a metre of 12 syllables, with the scheme $\text{u}-, \text{u}-, | -\text{u}, | \text{u}-, \text{u}-, \text{u}-$. Variation is here introduced by substituting a trochee for an iambus in the third foot where occurs the 'break'. The opening is an iambic metron (sequence 'B') and the last 6 syllables constitute the cadence. It is one of the popular metrical sequences ('Z'). This is almost invariably the cadence of the metres in the Iambic group.

(2) If a spondee is substituted in the first foot of a VAṄCASTHĀ, we have a metre of 12 syllables, INDRAVAṄĀ ($--, \text{u}-| -\text{u}| \text{u}-, \text{u}-, \text{u}-$). The opening is another form of the iambic metron.

(3) If a pyrrhic is substituted in the third foot of INDRAVAṄĀ, we have a metre of 12 syllables, LALITĀ ($--, \text{u}-, | \text{u} \text{u}, | \text{u}-, \text{u}-, \text{u}-$).

Metres (1), (2) and (3) are three of the several forms of Vedic JAGATI.

(4) An acephalous LALITĀ is RATHODDHATA ($-\text{u}-| \text{u} \text{u}| \text{u}-, \text{u}-, \text{u}-$).

(5) If, to avoid the too slow opening in LALITĀ, the first longum is resolved into two shorts, we have a metre of 13 syllables, MAṄJUBHĀŚINI, with the scheme ($\text{u} \text{u}-, \text{u}-, | \text{u} \text{u}, | \text{u}-, \text{u}-, \text{u}-$). The opening is a dochmiac (sequence 'P').

(6) If a tribrach, an equivalent foot, is substituted for the trochee in the third foot of VAṄCASTHĀ we have a metre of 13 syllables, RUCIRĀ, with the scheme ($-\text{u}, -\text{u} | \text{u} \text{u} \text{u}, | \text{u}-, \text{u}-, \text{u}-$).

(7) If in the first foot of RUCIRĀ a spondee is substituted, we have a metre of 13 syllables, PRABHĀVATI ($--, -\text{u} | \text{u} \text{u} \text{u}, | \text{u}-, \text{u}-, \text{u}-$).

The five-foot Iambic line in its regular form is not found in Sanskrit. But there are a few metres which may be considered variants of it.

(8) CUDDHAVIRĀT, a metre of 10 syllables, with the scheme $--| -\text{u} | \text{u}-, \text{u}-, \text{u}-$ has the usual iambic cadence ('Z') consisting of the last three feet and a trochaic break as in VAṄCASTHĀ but the opening is a spondee. It is the same as INDRAVAṄĀ with a shortened opening, the second foot being omitted.

(9) If the first foot of GUDDHAVIRĀT is resolved into a proceleusmatic ($\text{u} \text{u} \text{u} \text{u}$) we have a metre of 12 syllables, MĀLATI, with the scheme $\text{u} \text{u} \text{u} \text{u}, | - \text{u}; \text{u} -, \text{u} -, \text{u} -$.

(10) An acephalous GUDDHAVIRĀT with the first and second members resolved into shorts, i.e. into a pyrrhic and a tribrach respectively, is called BHADRIKĀ ($\text{u} \text{u}, | \text{u} \text{u} \text{u}, | \text{u} -, \text{u} -, \text{u} -, \text{u} -$), a metre of 11 syllables.

(11) When BHADRIKĀ and MĀLATI constitute alternate lines of a stanza, it is called APARAVAKTRA ($\text{u} \text{u} | \text{u} \text{u} \text{u} | \text{u} -, \text{u} -, \text{u} - | \text{u} \text{u} \text{u} \text{u} | - \text{u} | \text{u} -, \text{u} -, \text{u} -$).

(12) When APARAVAKTRA is extended by addition of a longum at the end of each line, it is called PUŚPITĀGRA ($\text{u} \text{u} | \text{u} \text{u} \text{u} | \text{u} -, \text{u} -, \text{u} -, \text{u} - | \text{u} \text{u} \text{u} \text{u} | - \text{u} | \text{u} -, \text{u} -, \text{u} -, \text{u} -$). The cadence here is the sequence ('Δ').

The Trochaic Group

There are not many metrical types in the Trochaic group. The most famous is TŪNAKA, a metre of 15 syllables, with the scheme $- \text{u}, - \text{u}, | - \text{u}, - \text{u} | - \text{u}, - \text{u} | - \text{u}, -$. It is the trochaic tetrameter catalectic of Greek prosody. It is not catalogued by Pingala and it must have come into vogue at a later date under the influence of native Indian metres.

TŪNAKA is sometimes called a doubled form SAMĀNIKĀ, a trochaic metre of 8 syllables ($- \text{u} - \text{u} - \text{u} - \text{u}$). But this latter metre is also not catalogued by Pingala.

There is a catalectic form of SAMĀNIKĀ, sometimes called SAMĀNI ($- \text{u} - \text{u} - \text{u} -$), but this also is not catalogued by Pingala. (It is called 'lecythion' in Greek and Latin prosody.)

The Dactylic Group

There is only one pure dactylic metre known in Sanskrit prosody, and that is MOTĀKA (or MODAKA). It is dactylic tetrameter with the scheme $- \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}$. But like many other strictly regular types it came into vogue at a later date.

The earliest in this group to come into vogue was probably DODHAKA, a metre of 11 syllables, with the scheme $- \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}, - \text{u}$. The substitution of an equivalent foot, spondee, for a dactyl in the last foot is the special feature of this metre, and its resemblance to dactylic hexameter of Old Greek is obvious. There is, however, no evidence to prove that DODHAKA may have been derived from the Homeric metre (Dactylic hexameter of Old Greek).

From DODHAKA may be derived SWĀGATA, a metre of 11 syllables ($- \text{u} -, \text{u} \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}$), by anaclasis leading to interchange between the third and the fourth syllables.

If there be a further anaclasis involving an interchange between the ninth and tenth syllables, we get RATHODDHATA ($- \text{u} - \text{u} \text{u} \text{u} - \text{u} - \text{u} -$).

[RATHODDHATA may also be analysed as a metre with a predominating iambic rhythm as has been done in an earlier section. This ambivalence is a special charm of this well-known metre which has been exploited by Kālidāsa, Bhāravi, Māgha and many other famous poets.]

If the first longum in DODHAKA is resolved into two shorts to give the metre a quicker opening, we get TĀMARASA, a metre of 12 syllables, with the scheme $\text{u} \text{u} \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}, - \text{u} \text{u}$.

If a dactylic pentameter is modified by anaclasis involving interchange between the third and the fourth syllables and the last syllable is lengthened in accordance with the principle that the last element in a line must be

long, we get **UTSARA**, a metre of 15 syllables, with the scheme --, u, -u, -u, -u.
 (It is, however, not a metre in common use.)

The Anapaestic Group

In the anapaestic group the best-known and one of the oldest is **TOṬAKA**, the regular anapaestic tetrameter (-, -, -, -). We are not sure whether this metre has an ultimate Prakṛitic origin, as suggested by some, though the very regularity might be an evidence in support of this view.

An almost equally old anapaestic metre is **PRAMITĀKṢĀRA**, also a metre of 12 syllables, obtained by anaclasis in the second foot of **TOṬAKA**. The metrical scheme is -, -, -, -. There is a pleasant variation of the rhythmic effect about the middle of the line, a little slowed down at first and quickened immediately afterwards.

Progressive variation of the rhythmic tempo is noticeable in another variant of **TOṬAKA**, viz. **DRUTAVILAMBITA**, an anapaestic metre of 12 syllables, obtained by anacrusis in the first foot and syncopation in the last foot of **TOṬAKA**. The metrical scheme is -, -, -, -.

If **PRAMITĀKṢĀRA** is extended by addition of a longum, we get a metre of 13 syllables, **KALAHĀNSA**, with the metrical scheme -, -, -, -, -.

If two shorts are prefixed to **PRAMITĀKSĀRA** by way of anacrusis, we get **PRAMADĀ**, a metre of 14 syllables, with the scheme ,, -, -, -, -, -.

If another anapaest is added to **PRAMADĀ**, we get **KOKILAKA**, a metre of 17 syllables, with the scheme ,, -, -, |-, -, -, -. It is practically an anapaestic pentameter with anacrusis.

[It is also called **AVITATHA** (if no caesura is recognized) and **NARDATAKA** (if the caesura is placed after the seventh syllable). Pingala classifies these as 'Gathā' metres or lyric metres.]

Anapaestic trimeter with the addition of a longum is called **MEGHAVITĀNA**, a metre of 10 syllables, with the scheme -, -, -, -.

In **HARIṄAPLUTA**, the first and the third verses are anapaestic tetrametres with syncopation at the end, that is to say, they are verses of 11 syllables with the scheme -, -, -, -; the second and the fourth have an extra short by way of anacrusis, that is to say, they are the same as **DRUTAVILAMBITA** (-, -, -, -).

The Cretic Group

One of the best-known metres in this group is **SRAGVINI**, the regular cretic tetrameter (--, --, --, --).

If the second foot of **SRAGVINI** is substituted by a tribrach to quicken the tempo about the middle of the line, and two compensatory shorts be prefixed to the line by way of anacrusis, we get a metre of 14 syllables, called **MANJARI**, with the scheme , --|,, ;--, --. The tribrach provides the 'break' in the metre.

An amphibrach prefixed to **MANJARI** would turn it into a **PRTHVI**, a metre of 17 syllables, with the scheme -, -, --|-, ;--, --. (**PRTHVI** is probably best taken as a composite verse. The first colon itself is a verse-type with 8 syllables and has resemblances to a type of **VITĀNA**, though the particular sequence does not appear to

have received recognition. It may be also suggested that PRTHVI is an expanded form of SRAGVINI, obtained by inserting a pyrrhic as a buffer between the first cretic and the second and a tribrach between the second cretic and the third. Such 'compounding' is allowed in Greek and Latin prosody.)

Combinations of tribrachs and creticas give us several well-known colas and metres. A tribrach followed by two creticas constitute the second colon in MAÑJARI and PRTHVI. Two tribrachs followed by two creticas give us the 12-syllabled metre PRABHĀ (˘ ˘ ˘, ˘ ˘ ˘, -˘ -, -˘ -). If two tribrachs are followed by four creticas, we get the 18-syllabled metre MAHĀ-MĀLIKĀ (or NĀRĀCAKA), with the scheme ˘ ˘ ˘, ˘ ˘ ˘, -˘ -, -| ˘ -, -˘ -, -˘ -. If two tribrachs are followed by seven creticas, we get the 27-syllabled metre, the CĀNDAVRŚTIPRAPĀTA variety of DĀNDAKA, with the scheme ˘ ˘ ˘, ˘ ˘ ˘, -˘ -, -˘ -, -˘ -, -˘ -, -˘ -, -˘ -, -˘ -.

The Bacchiac Group

The one important metre in this group is BHUJAṄGAPRAYĀTA, a metre of 12 syllables, with the scheme -˘ -, -˘ -, -˘ -, -˘ -.

The Paeonic Group

To this group belongs DRUTAPADA (˘ ˘ ˘ -, ˘ ˘ ˘ ˘, ˘ ˘ --). The basic foot is the fourth paeon (˘ ˘ ˘ -). It is quickened at the 'break' into a proceleusmatic (˘ ˘ ˘ ˘) and, as usual, slowed down at the close into a compensatory ionic *a minore* (˘ ˘ --).

MIXED METRES

There are a number of metres in which feet of equivalent moric value are associated according to a rhythmic pattern. These are usually tri-syllabic feet with a total moric value of 4 morae in each.

Combinations of amphibrachs and anapaests are quite common. The simplest is JALODDHATAGATI, a metre of 12 syllables, with the scheme (˘ -˘, ˘ ˘ - | ˘ -˘, ˘ ˘ -), in which amphibrachs and anapaests alternate. By anaclasis any amphibrach could be turned into an anapaest, and vice versa.

In VASANTATILAKA a spondee (also a foot of 4 morae) is prefixed to the scheme of JALODDHATAGATI and the order of feet is reversed in the second half. This gives us a metre of 14 syllables with the scheme (-, ˘ -˘, ˘ ˘ -; ˘ ˘ -, ˘ -˘). (As it is the usual habit to pronounce the last syllable as a long, the last foot is practically turned into a bacchiac.)

In DHIRALALITĀ, a metre of 16 syllables, a longum is prefixed by way of anacrusis to a procession of anapaests and amphibrachs in alternation, the metrical scheme being -, ˘ ˘ -, ˘ -˘, ˘ ˘ -, ˘ -˘, ˘ ˘ -.

If the longum at the commencement of DHIRALALITĀ is resolved into two shorts, we get VILĀSINI, a metre of 17 syllables, with the scheme ˘ -, ˘ ˘ -, ˘ -˘, ˘ ˘ -, ˘ -˘, ˘ ˘ -.

The very long metre of 23 syllables, AQVALALITĀ (or ADRITANAYA), is practically a composite metre with the scheme (˘ -, ˘ ˘ -, ˘ -˘, ˘ ˘ - | -˘ -, ˘ ˘ -, ˘ -˘, ˘ ˘ -). The first half consisting of 11 syllables is shortened VILĀSINI, the last two feet having been left out. The second half consisting of 12 syllables repeats the scheme of the first with the addition of a longum at the commencement, so that it becomes a procession of feet in which a dactyl, an anapaest, an amphibrach and another anapaest

follow in the order named. By anaclasis each of them could be turned into an amphibrach, so that the second half-line may be considered an amphibrachic tetrameter with anaclasis.

DHRTACRI is a long metre of 21 syllables, consisting of 7 trisyllabic feet. There is the opening with a tribrach, and the next six are amphibrachs with minor variations. As usual, there is the variation about the middle of the line in the third foot which is turned into a dactyl by anaclasis. The last foot is made heavier and slower by substituting a cretic for an amphibrach, the closing cretic being compensatory for the tribrach at the commencement. The entire metrical scheme is thus $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$.

There are some mixed metres which cannot be analysed into feet of equivalent moric value, nor are they based on feet of any particular pattern. These are older metres descended from the Vedic and continue the older metrical tradition.

Of these the three most important are **INDRAVAJRA**, **UPENDRAVAJRA**, and **PRAHARŚINI**.

As has been observed already, **INDRAVAJRA** with its variant **UPENDRAVAJRA** is descended from the Vedic **TRIṢTUBH**, and its 11 syllables are arranged according to the sequence $\text{---} \text{---} \text{---} ; \text{---} \text{---} \text{---} ; \text{---} \text{---} \text{---}$, the only difference with **UPENDRAVAJRA** being that in the latter the first syllable is a short. The opening is thus an iambic metron ($\text{---} \text{---}$), the break is a dactyl, and the cadence is a trochaic metron ($\text{---} \text{---} \text{---}$). The change from the iambic rhythm at the commencement to the trochaic at the close is one of its characteristics.

PRAHARŚINI is a metre of 13 syllables, with the metrical scheme $\text{---} \text{---} \text{---} | \text{---} \text{---} \text{---} | \text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$. The opening is a slow foot, molossus ($\text{---} \text{---} \text{---}$), and it is counterpoised by the 'break', a quick foot, tribrach ($\text{---} \text{---} \text{---}$); the two rhythmic motifs are synthetized in the cadence consisting of 3 iambic feet rounded off by a longum (metrical sequence ' Δ '). This is, as has been previously noted, a very common rhythmic principle followed in the structure of a very large number of Sanskrit metres.

[**PRAHARŚINI** seems to be an extension by elongation of one type of Vedic **JAGATI** ($\text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---} \text{---}$), the only difference being that the fourth syllable in **PRAHARŚINI** is a short instead of a longum.]

[**PRAHARŚINI** (*lit. making merry*) has resemblances to Greek drinking songs (*scolia*) in its structure. Compounding a hypermetric glyconic ($\text{---} \text{---} \text{---} \text{---} \text{---}$) with a fourth paeon ($\text{---} \text{---} \text{---}$), inserted after the fourth syllable, we could get the scheme of **PRAHARŚINI** ($\text{---} \text{---} \text{---} | \text{---} \text{---} \text{---} | \text{---} \text{---} \text{---}$). Such compounding is a feature of the *scolia*.]

SYLLABIC METRES BASED ON MORIC VALUE

There are a number of metres which are, in spite of the rigidity of the metrical sequence, based on the total moric values of their components. They are mostly of later origin and must have been influenced by Prākṛit traditions.

Most of them are composed in lines with a total value of 16 morae each. Each line could be resolved into groups or feet of 4 morae, though there is a certain rigidity about the sequence of longs and shorts in particular groups.

The simplest in structure is **ACALADHRTI** with 16 short syllables ($\text{---} \text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---} \text{---}$).

If the last two shorts are integrated into a longum we get a metre of 15 syllables, **MANIGUNANIKARA** ($\text{---} \text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---} \text{---}$ | $\text{---} \text{---} \text{---} \text{---}$, $\text{---} \text{---}$). It may

be noted that here the last syllable is, according to usual practice, a longum, and the last colon is one of the standard metrical sequences (sequence 'α').

If the last two syllables in the first colon also are integrated, we have a metre of 14 syllables, PRAHARANAKALITĀ (◦◦◦◦, ◦◦|◦◦◦◦, ◦◦). It is 'α' + 'α'.

By further integration towards the end of each colon, we get KUSUMAVICITRĀ, a metre of 12 syllables, with the scheme ◦◦◦◦, --|◦◦◦◦, --.

Integrating also the first two shorts of the second colon in the above we get a metre of 11 syllables, ANAVASITĀ (◦◦◦◦, --, |◦◦, --). The slowing down of the tempo about the middle of the line is a feature of this metre.

If the first two shorts of the first colon in ANAVASITĀ are also integrated, we have a metre of 10 syllables, RUKMAVATI (−◦, --|−◦, --).

Further integration would turn it into a VIDYUNMĀLA, a metre of 8 syllables, all the syllables being long. The metrical scheme is --, --|--, --. Both the members of the metre are dispondees (sequence 'A').

MATTĀ and BHRAMARAVILASITĀ are metres in which integration of shorts is thoroughly done in the first colon but only partially in the second. In MATTĀ (----|◦◦◦◦, --), a metre of 10 syllables, the first colon of VIDYUNMĀLA is combined with the second colon in KUSUMAVICITRĀ, while in BHRAMARAVILASITĀ (----|◦◦◦◦, ◦◦), a metre of 11 syllables, the first colon of VIDYUNMĀLA is combined with the second colon in PRAHARANAKALITĀ.

All these metres could be ultimately resolved into feet of 4 morae, the simplest form of which is the procelesmatic (◦◦◦◦). But it was never recognized by Sanskrit prosodists as a unit of versification. The inevitable conclusion is that these are really moric metres with a different origin and were accepted by Sanskrit prosodists only at a later period.

Tripartite Moric Metres

There are a few metres, really based on the moric values of the components, in which the constituent members are not equivalent so far as the total morae are concerned. They have the tripartite structure of the older metres, and some of them like TANUMADHYĀ may have been fairly old, although we do not know whether they were in use earlier than the post-Kālidāsa age.

The first of these metres is TANUMADHYĀ, a metre of 6 syllables, with the scheme --, ◦◦, --. A line in this metre is so short that we might consider it to be only a colon composed of two metra, an antibacchiac and a bacchiac, and that is how it is analysed by older prosodists. But similarities in structural principles between TANUMADHYĀ and a few other metres lend support to the view that this is a tripartite metre with a spondee as the 'opening', a pyrrhic as the 'break' and another spondee as the 'cadence', and thus conforms to a very ancient rhythmic idea.

JALADHARAMĀLA, a metre of 12 syllables, with the scheme ----|◦◦◦◦; ---- is a doubled form of TANUMADHYĀ. The opening is a dispondee, the break a procelesmatic, and the cadence is another dispondee.

MADHYAKṢĀMĀ, a metre of 14 syllables, with the scheme --, --|◦◦◦◦, ◦◦◦|--, --, has a similar structure. Its only difference from JALADHARAMĀLA is that it has a longer middle, the second member being composed of two tribrachs while the first and the third are dispondees.

There is the same rhythmic idea behind each of these three metres, the opening and the close having a slow tempo and the middle having a quicker.

COMPOSITE METRES

Most of the more elaborate and ornate metres in Sanskrit are composite metres. They are combinations of certain metrical sequences, many of which are well known and popular. A list of these standard metrical sequences has been given in a previous section. Some of these composite metres are bipartite and some are tripartite.

We may begin our study of composite metres with an analysis of the well-known and comparatively older type, *çALINI* (---|---|---). It is a combination of the sequences 'A' and 'γ' (as catalogued in the list of standard metrical sequences). It has a slow 'opening' and a 'cadence' with a waved rhythm. It is (*A+γ*).

If the sequence (X) is inserted between the two cola of *çALINI*, we have *MANDÄKRÄNTÄ* (---|---|---), a tripartite metre with a slow rhythm at the 'opening', a quick rhythm in the middle and a waved rhythm at the close. It is (*A+X+γ*).

If the scheme for the first two cola of *MANDÄKRÄNTÄ* is practically doubled and the third colon is a (β), we have the very long metre of 26 syllables, *BHUJÄNGAVIJRMBHITA* (---, ---|---, ---|---, ---). It is practically (*2A+2X+β*).

In *HARINI* the first two cola of *MANDÄKRÄNTÄ* interchange their positions and are followed by a 'β'. It is (*X+A+β*) and the detailed scheme is ---|---|---|---.

If the first colon of *MANDÄKRÄNTÄ* is enlarged by adding an iambic foot at the commencement, in other words, if the first colon be a Y, we have *MEGHAVISPHÜRJITA* (---|---|---). It is (*Y+X+γ*).

In *çIKHARINI* (---|---|---), which is really a tripartite metre in spite of the fact that only one caesure to the line is recognized by Pingala, the first two cola are the same as in *MEGHAVISPHÜRJITA* while the third colon is only another form of the sequence 'XX' as the two shorts at the end of 'XX' have here been integrated into a longum. The whole scheme is practically (*Y+X+XX*).

If the first colon of *çALINI* is enlarged by the addition of a longum, we have *VAIQVADEVI* (---|---). It is {(*A+l*)+*γ*}.

If the first three syllables of *VAIQVADEVI* are resolved into shorts, in other words, if the first colon consists of two tribrachs followed by a spondee, we get *MÄLINI*, a metre of 15 syllables, with the scheme ---|---|---|---. It will be noticed that the first colon is an elongation of sequence 'α'. So *MÄLINI* is {(*α+l*)+*γ*}.

Among other metres opening with a disponsdee we have *MATTAMAYÜRA* and *VÄTORMI*. The first (*MATTAMAYÜRA*) is a metre of 13 syllables in which the first colon is a disponsdee and the second is composed of two choriams followed by a longum. The scheme is ---|---, ---, ---. The second (*VÄTORMI*) is a metre of 11 syllables, in which also the first colon is a disponsdee and the second is composed of three iambs (with anaclasis) followed by a longum. The scheme is ---|---. It is practically (*A+Δ*). (The second colon might also be considered as consisting of two ionic *a minore* metra with syncopation.)

Next, we take up another group of metres in which the components are mainly cola of 7 syllables. The most famous in the group is the solemn *SEAGDHARA*, a tripartite metre of 21 syllables, with 3 members of 7 syllables each. The structural principle is the same as in *MANDÄKRÄNTÄ*, the rhythm being slow in the first colon, quick in the second, and waved in the last.

The whole scheme is -----| u u u u u - | - u - u -. It is ($\theta + \alpha + \gamma$). (It may be noted that the third colon is practically only a variant of the first colon.)

KṣAMA is a shortened form of SRAGDHARA. The first colon is omitted, and the last is reduced to only 6 syllables by dropping the final longum. It is thus a metre of 13 syllables with the scheme (u u u, u u u, -| - u -, - u -).

SUVADANA is only a variant of SRAGDHARA. The first two cola are exactly the same as in SRAGDHARA. The last colon only is different being composed of three longs and three shorts, of which the shorts are all positioned in the middle. It is ($\theta + \alpha + ZZ$), the whole scheme being -----| u u u u u - | -- u u -.

There are certain metres which are not entirely composed of standard metrical sequences. Shorter metrical schemes are variously manipulated and associated to make up these metres. Amongst them the two best-known metres are VAÑCAPATRAPATITA and ÇÄRDÜLAVIKRIDITA.

VAÑCAPATRAPATITA is a metre of 17 syllables, with two members of 10 and 7 syllables respectively. The first member is practically an anapaestic trimeter with a longum prefixed by way of anacrusis, a slight variation from the type being due to anaclasis between the sixth and seventh syllables. The metrical scheme here is comparable to that in PRAMITAKṢARA and PRAMADA. The second member is the well-known metrical sequence ' α '. The whole scheme for the metre is -, u u -, u - u, u u -| u u u, u u u, -.

ÇÄRDÜLAVIKRIDITA is a metre of 19 syllables with two members of 12 and 7 syllables respectively. If a spondee is prefixed to the first member of VAÑCAPATRAPATITA, we get the first member of ÇÄRDÜLAVIKRIDITA. In other words, if a molossus is substituted in the first foot and an amphibrach in the third foot of an anapaestic tetrameter, we get the first member of ÇÄRDÜLAVIKRIDITA, the scheme for the first member being ---, u u -, u - u, u u -. It may be noticed that the rhythmic idea here is similar to that in another popular metre, viz. VASANTATILAKA, where also there is a slow opening foot followed by a number of trisyllabic feet with a longum in each. The second member of ÇÄRDÜLAVIKRIDITA is the sequence ' $\gamma\gamma$ '. The whole scheme for the metre is thus ---, u u -, u - u, u u -| -- u, --- u. -.

The structure of other syllabic metres could be explicated in accordance with the principles enunciated and illustrated in the preceding sections.

AN UNFINISHED *REKHĀ DEUL* OF PURULIĀ

By ADRIS BANERJI

The old district of Mānbhum has disappeared from the map of India and, having been dismembered, the two portions have been renamed. The land of the Māṇa Kings is no more. The major portion which remains with Bihar is called Dhānbād while one subdivision, that forms a part of West Bengal, is known as Puruliā. Geographically, like Bānkurā, it is a part of Chotā-Nāgpur plateau possessing all its peculiarities and topographical features; washed by Suvarnarekhā, Kāmsāvatī (vulgo Kāñsāi), Dāmodar, etc. It has the same undulating land surface, the identical fertility and mixed population of Māhtos, Bengalis and aboriginal races. Due to the fact that two important routes crossed the area, the people are culturally connected with Orissa and West Bengal which is broad-based upon Niṣāda culture of the Proto-Austroloids who, driven from the more fertile and accessible areas, for millenniums have occupied the forest and hill tracts. Now they are being engulfed by the industrial impact of the Planning Commission. Like Bhils of Mewār and Mundās of Rāñchi and Singhbhum they are Christians.

Such an area is expected to preserve for the investigators remains of material culture from the early Stone Age and this actually is the case.

The aim of this paper is to discuss a *rekhā* temple (*deul*) at Bāndā, unfinished at that. The small village of Bāndā, on the banks of a rock-strewn stream, has been completely eclipsed by its more populous and opulent neighbour Cēlliyāmā with its Block-development offices, hospital, etc. Very few passers-by notice the fane with its damaged *āmalaka* standing forlornly on a knoll. To reach the hamlet, one has to travel by the tarred road from Puruliā to Ādrā. At Raghunāthpur, a good-weather road bifurcates to Cēlliyāmā. From Puruliā to Raghunāthpur it is 26 miles and from Raghunāthpur to Cēlliyāmā it is 11 miles.

The temple was built on a *jagati* or an artificial platform edged with stones. It would be idle to conjecture whether it was surrounded by a wall but occurrence of brick-bats on the western and southern sides suggests the existence of such an enclosing wall.¹ Alternatively, they might be the ruins of small rooms occupied by priests or labourers. The shrine is built of local sandstone which is very soft and has suffered from weathering and saltpetre action (Pl. 1).²

It consists of a *garbhagriha*, *mukhamandapa* and an open hall joined axially, the last devoid of any ornaments. While the stones of the sanctum and the *gandi* are a fine-grained variety, those of the porch and its adjunct are coarse-grained. The temple was first noticed by J. D. M. Beglar. Since, there has not been any appreciable change.

If the platform bordered with stones is the *pista*, we have here a departure from the known examples in Orissa or elsewhere. That this *pista* was an essential feature of the design is undeniable. It is built on the top of an undulating ground, therefore for future stability it was necessary. Whether the rise is an artificial mound containing ruins of earlier remains

¹ Such debris occur in many temples at Visnupura.

² A. Cunningham: *Annual Report of the Archaeological Survey of India*, Vol. VIII, pp. 168 ff.

or one of the natural features cannot be decided. But the *Silpin* had to resolve the problem and the answer was the stylobate.

Internally the *garbhagriha* is square and externally cross-shaped with the addition of *rathas*. It has three *bhadras* or *rāhās* on three sides. The *bādā* is *tri-anga-pābhāga*, *janghā* and *baranda*. It contains three *kūṭas* on three sides, southern, western and northern. But none of these contain any image. The eastern face is occupied by the entrance.

The *gandis* of all *rekhā deuls* incline inwards in a curve and the same is the case with that in the shrine under discussion. By continuation of the projections of the *bādā*, the *gandī* was vertically divided into parallel bands designated *pagas*. The corner *paga* was known as *kanika*, the central projection or the *bhadra* of the north Indian temples was known as *rāhā paga* and that or those between them was called *anurāhā paga*. To avoid monotony and introduce an element of contrast in this orchestration of parallel motifs, *kanika paga* again was divided in a number of horizontal sections, one above the other, each styled as *bhūmi*, separated from one another by three-quarters section of an *āmalaka* fruit (*Phyllanthus embellica*) which is known as *bhūmi āmlā*. In our example there are seven such *bhūmis* (Pl. 2).

Where the *gandī* ends, making a sweeping curve, the portion is known as *bisama*. This is the topmost course with or without *paga* divisions. In the present example, the *pagas* continue. The final portion is called *mastaka* and consists of several parts. The recessed section immediately above *bisama* is known as *kantha* or *grivā* or *beki*. The next section is *āmlā* or *āmalaka*; over which is the *khapuri*, superimposed on which is the *kalasa* holding the *dhvaja* or *āyudha* of the presiding divinity. The decorations on the southern *rāhā paga* are unfinished. The traces of sketches made by chisels can be seen immediately on the level of the *baranda* (Pl. 2). They also indicate that they were drawn and carved when in position. The same *paga* on the western side is elaborately ornamented. The motifs consist of a *jālaka* of diminutive *chaitya* windows and coils of two snakes intertwined. The *chaitya* windows are also found repeated on the northern *rāhā paga* which end about a metre below the *bisama*—evidently never finished.

Before proceeding to describe the *garbhagriha*, it would be quid pro quo to examine the methods of construction of the *gandī* or the tower. Beglar was puzzled by the two superimposed cells above the *garbhagriha* though he divined correctly their purpose. He says: 'The wall of temple of this type being very thin . . . and towers having thin walls as sides, being very high, it became a constructive necessity to tie the walls together at regular intervals, to give the necessary rigidity and stability to the tower; this is most easily and economically and unobtrusively done by floors extending across internally, cutting up the tall tower into a number of more stable low chambers.'¹

Researches of Professor N. K. Bose have established that architects and engineers of Orissa, being conscious of the evident weakness in the construction of the lofty *gandis* with the heavy weight of superimposed lithic mass on the four walls of the *bādā*, invented the system of tying up the side walls with the help of series of ceilings technically called *mudas*, in order to impart greater stability to the towers. If there is one ceiling above the roof of the *garbhagriha* it is called *garbha-muda*. In elaborate and larger examples, the process was repeated at a higher level.² In the *Bāndā* temple,

¹ Cunningham: *op. cit.*, pp. 168-69.

² 'Mandirer Antara' (in Bengali). *Bangiya Sahitya Parishat Patrika*, Vol. XLVI, No. 2 (B.S. 1346), pp. 91-98.

there is a second chamber above the first, designated *rājna-muda*. The Lingarāja temple at Bhubaneśvara, whose *gandi* is 148 feet in height, approximately, has three such *mudas*. Access to these was often provided. But whether this was the case with the present example we are not in a position to assert. Beglar was puzzled about how these openings were closed. It is easy to infer. The lowest was covered possibly by the top of the *chaitya gavāksha* with *sārdula* or *virāla* motif. Before I close the section, indulgence is craved to point out that Paramāra architects applied this system of *mudas* in the temples at Unavimśatikoṭī (modern Un in Dewas district).¹

The cella as is always the case is a plain square room with a *vedikā* for the image, which clarifies one fact that an image, not a *Linga*, was expected to be installed within. Below it the stone-paved floor has a hole on the northern side with a gargoyle (*makara-mukha*) for the ritual water to drain out. The doorway was ornate. It had a bulbous or convex *lalātavimba* on the *urddhapaṭṭikā*. The door-frame consists of four *sākhās*, such as *patra*, *kinnara*, etc.

The form of *jagamohana* will never be known, except that its ground plan was rectangular. Its pillars and architraves are lying before the *garbhagriha* in a pile. They are round and more or less plain and lack the elaborate decorations of the Orissan examples. At the head of the *mukha-mandapa* is a pillared hall, running north to south, possibly a *bhoga-mandapa*. This on good grounds has been ascribed to a later date. If slight excavations to clear the *mandapa* are carried out, the question may be finally decided.

In the absence of any objective data, the date of the temple is likely to remain a problem. Nevertheless, an analysis of the style is likely to help our purposes. Professor N. K. Bose has made known to us the type-technological contents of the canons written in *Oriyā*. It is to him that we owe all the terms used in this discussion. Both the *deul* and the *jagamohana*, like their Orissan prototypes, can be divided into four parts along the vertical axis, *pīṭa*, *bādā*, *gandi* and *mastaka*. Almost all scholars have suggested that *pīṭa* is a variable element in Orissa. To some extent it is true, but, after a recent visit to Bhubaneśvara and several other sites in Orissa, the present writer feels that in many cases, due to the rise in ground level such as at Mukteśvara, the *pīṭa* might have been covered up.

The *bādā* as already discussed is *tri-anga* as is the case with the earlier temples. The survival of this early feature may have been due probably to its remoteness from the classical centres of the school in Kalinga, in a forest area. Just as it is possible to have backwaters by the side of a swift navigable river, in the same way, when Orissan architects progressed, the provincial artists in the jungle tracts of medieval Māṇabhūmi (that is land of the *Māṇa rājās*) had not been able to keep pace. The *gandi* of a *rekhā deul* inclines inward in a convex curve like a hyperbola; while in the later temples the curve is like that of a parabola. If a comparative study of the *gandis* from Parasurameśvara to Lingarāja temple is made, we come to the conclusion that the *gandi* evolved itself accompanied by greater refinement and polish. The *gandi* of the Bāndā temple, in shape and form, has greater affinity with that of the Lingarāja which, in the opinion of the writer, takes it to the twelfth century of the Christian era.

Who could have built this temple? The sketch of the history of Puruliā that we possess tells us that the area formed a part of Rādhā.² In fact,

¹ Cf. the present writer's 'Paramāra Temples of Mālwā'. *Journal of U.P. Historical Society*, Vol. XVI, Pt. I, pp. 84-111.

² Sametāśikharā was in Rādhā or Lāda in apabhramśa Prākṛit; cf. present writer's 'Jainism in Bengal'. *JUPHS*, Vol. XXIII, pp. 164-68.

it was a buffer district between Bihar and Orissa on one side and West Bengal on the other. As a result of this contiguity, all the three States at one time or another have enjoyed sovereign rights over this tract whenever a powerful dynasty rose in one or other of these States. Sometimes local dynasts made themselves independent, such as the Māṇas, the Sūras and the Mallas of Viṣṇupur, etc. When Ikhtyār-ud-din Muhammad ibn Bakhtyār Khālji and after him Khalj Mālik of Lakhnāwātī occupied northern Bengal, Puruliā, having become a no-man's land, enjoyed some sort of autonomy till the Eastern Ganga Kings occupied the whole of southern Bengal up to the Ganges or Trivenī as their inscriptions testify.¹ The Gaṅgas were famous builders and it is likely that their barons and officials followed their example. One of whom, the feoffee of Puruliā or Cēlliyāmā, might have erected this temple.

If my presumption is correct, that this temple was erected about the thirteenth century A.D., the reason for its being left unfinished is not difficult to imagine. Sri N. B. Roy had published a Persian manuscript, *Sirāt-i-Firuz Shāhi*, of the Khudabux Library, Bānkīpur (Patna). This work is an important account of an invasion of Orissa by Firoz Tughluq² in the reign of Bhānudeva III. The Sultan arrived in Bihar in A.D. 1360. From there through Jhārkhaṇḍ he reached Pāchet and thence to Śekhar (Śikharabhūmi).³ From there he reached Khiching ([sic] Kinianagar) and sacked the Bhāñja capital. Then the Sultan's army made a forced march through Keonjihar district burning and looting and reached Cuttack district. The mention of Pāchet clarifies the route of the invasion. This is probably the reason why the temple was never finished and the *jagamohana* is found in ruins.

Before I conclude, I must clarify that during my short tour of Puruliā I found other temple types such as *do-chālā*, *chār-chālā* and *pañcha ratna* sikhara of West Bengal.

¹ For the best account, refer to S. N. Rajguru: 'Kenduli C P. Grant of Narasimha-deva, Śaka 1305'. *Orissa Historical Society Journal*, Vol V (1956), pp 67-80.

² *Journal of the Royal Asiatic Society of Bengal*, Letters, Vol VIII (1942), pp 57-98.

³ Dr. H. K. Mehtab: 'Invasion of Orissa in A D. 1360'. *OHR SJ*, Vol. I (1952), pp. 30 ff.



FIG. 1. A view of the doorway of the Banda Temple showing the *mudas* one above the other.



FIG. 2. Closer view of the western rākāpaga. Note the unfinished sketch possibly of a chāitya-gavāḍkha immediately below *gāṇḍī*.

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Bändā, Dist. Puruliā.



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FIG. 3. Back view of the Bāndā Temple, Dist. Puruliā.

AN EVIDENCE OF AGRIPPA RELATING
TO THE PARTHIAN EMPIRE

BY B. N. MUKHERJEE

The *Naturalis Historia* of Pliny, dedicated to Titus in A.D. 77,¹ states that Marcus Agrippa intended 'to set before the eyes of the world a survey of the earth' and that Augustus Caesar 'completed the portico containing a plan of the world that had been begun by his sister in accordance with the design and memoranda of Marcus Agrippa'.²

It seems that the latter prepared a geographical survey to facilitate, *inter alia*, the drawing of a map of the world to be set up in Rome before the 'eyes of the world'. It also appears that Agrippa himself was not alive when the construction of the portico displaying this map was completed. There is no reason to believe either that an unusually long time was spent in building a single portico, or that there was a great interval between the completion of the survey of the world and the beginning of that construction. Hence it may be inferred that Agrippa finished his work in the later period of his life.

He was born in c. 63 B.C. And, as he could not possibly have begun his survey before attaining a sufficiently mature age, the commencement of such a work could not have taken place before at least c. 43 B.C. It is more probable that it was started several years later. So it may be suggested that Agrippa surveyed the known world some time between c. 43 B.C. and c. 12 B.C., the year of his death.³

Neither Agrippa's survey, which may have been appended to the map as a commentary on it,⁴ nor the map itself has survived to our time. Nevertheless, some of his observations were incorporated in the writings of some classical authors. According to one of his statements, preserved in a passage in the *Naturalis Historia*, Media Parthia and Persidae were bounded on the east by the Indus, on the west by the Tigris, on the north by the Taurus and Caucasus mountains and on the south by the Red Sea, and covered an area of 1,320 miles in length and of 840 miles in breadth.⁵

The *Dimensuratio Provinciarum*, prepared between c. A.D. 393 and 417,⁶ adds, apparently following, among others, the authority of Agrippa,⁷ Carmania and Ariana to the above list of countries, replaces the Tigris and

¹ Pliny, *Naturalis Historia* (cited below as *NH*), Preface, sec. 3. It is believed that revisions were still in progress at the time of Pliny's death in A.D. 79. M. Cary *et al.*, *The Oxford Classical Dictionary* (cited below as *Oxford Classical Dictionary*), p. 704.

² *NH*, III, 2, 17. The term 'sister' in this passage probably refers to Polla, sister of Agrippa. [Cambridge Ancient History (cited below as *CAH*), Vol. X, p. 572].

³ For an account of life and activities of M. Agrippa, see *Oxford Classical Dictionary*, p. 25.

⁴ E. H. Bunbury, *A History of Ancient Geography*, Vol. II, p. 177. It has been observed that the anonymous work often cited by Strabo under the title of ὁ χωρογρόφος was the commentary appended to Agrippa's map or was an account directly derived from it. (*Ibid.*, p. 177, n. 7).

⁵ *NH*, VI, 31, 137. Almost the same observation can be noticed in the *Divisio Orbis*, prepared in c. A.D. 393 (*Divisio Orbis*, 23; D. Detlefsen, *Ursprung, Einrichtung und Bedeutung der Erdkarte Agrippas*, pp. 19 and 54). Here the name of the Caucasus is omitted.

⁶ *Ibid.*, p. 19.

⁷ *Ibid.*, pp. 9 f.

the Red Sea respectively by Mesopotamia and the Persian Sea, and omits the Caucasus.¹

If one scrutinizes the observations of Agrippa, as far as can be gathered from other classical writers, it becomes apparent that he demarcated the boundaries sometimes of a single region and sometimes of a group of countries taken together.² The adoption of the latter system would have been meaningless unless different regions included in one group were related with one another by certain connections—political, administrative or otherwise.³

This inference is supported by the *Historiarum Adversum Paganos Libri VII* of Orosius, composed in A.D. 417-418.⁴ It has long been recognized that the description of the world, as is given in this treatise, is mainly, if not wholly, taken from a second century work based upon the geography of Agrippa.⁵ According to this text of Orosius, 'between the Indus on the east and the Tigris river, which lies on the west, are the following: Arachosia, Parthia, Assyria, Persida and Media, by nature rough and mountainous lands. On the north they are bounded by the Caucasian range, on the south by the Red Sea and the Persian Gulf, while in the centre flow their principal rivers, the Hydaspes and the Arbis. In these regions there are 32⁶ peoples. It (*the entire region between the Indus and the Tigris*) is commonly spoken of as Parthia, although the sacred Scriptures often call the whole area Media'.⁷ (*Italics ours*).

It seems that this passage is ultimately based on the above-mentioned information furnished by Agrippa, even though it may also contain supplementary remarks and interpretations. The last two sentences⁸ of the statement of Orosius make it clear that at least to him the report of Agrippa, quoted above, was a description of the boundaries of the Parthian empire. This interpretation of Orosius, whether his own or borrowed from an earlier source, makes Agrippa's enlisting of different countries in one group quite meaningful. Those different regions were inter-related as parts of the same Parthian empire. And there is no reason why we should reject such a logical explanation.

We are not sure whether Ariana and Carmania, referred to in the *Dimensuratio Provinciarum*, and Arachosia and Assyria, mentioned in the statement of Orasius, were included in the original account of Agrippa. For these countries do not figure in the earliest notice (viz. by Pliny) of Agrippa's list. Again, according to Pliny, Agrippa made the Tigris, the western boundary of the group of lands in question, whereas the *Dimensuratio Provinciarum* indicates that he accepted Mesopotamia as forming the western border. This problem, however, can be easily solved by pointing out that Agrippa himself is known to have taken Mesopotamia as

¹ *NH*, VI, p. 54; *Dimensuratio Provinciarum*, 2.

² D. Detlefsen, *op. cit.*, pp. 5 and 25 f.

³ *Ibid.*, pp. 4 f.

⁴ J. W. Raymond, *Seven Books of History Against the Pagans*, pp. 8-9 and 16.

⁵ J. Patsch, *Die Darstellung Europa in der geographischen Werke des Agrippa*, p. 11; F. Braun, *Die Entwicklung der Spanischen Provinzialgrenzen in römischer Zeit in Quellen und Forschungen zur alten Geschichte und Geographie*, Vol. XVII, p. 19. D. Detlefsen discusses the question of relationship between Orosius and Aethicus (*op. cit.*, p. 19).

⁶ C. , *Pauli Orosii Historiarum Adversum Paganos Libri*, VII, p. 6. In the translation given in the work of J. W. Raymond (*op. cit.*, p. 36) the number of peoples is stated as 23.

⁷ P. Orosius, *Historiarum Adversum Paganos Libri*, VII (cited below as *His. Ad. Pag.*), I, 2, 17-19.

⁸ *Ibid.*, I, 2, 19.

bounded by the Tigris on the east, the Euphrates on the west, the Taurus on the north and the Persian Sea on the south.¹ Hence, following Agrippa, the Tigris, flowing by the east of Mesopotamia, can be regarded as forming the western terminus of the group of the lands in question.²

This alignment of the western border of the group concerned—which denotes, as we have seen, the Parthian empire—indicates the date of the sources on which Agrippa based his statement. The demarcation of the eastern boundary of the Roman empire and consequently that of the western limits of the Parthian dominions were burning questions during most of the period (c. B.C. 43–12) in which Agrippa made his survey. Moreover, he himself was a high official in the Roman empire and twice served in the East. Hence it is difficult to believe that his conception of the western boundary of the Parthian territory was much out of date.³ In other words, the date of the sources of Agrippa's information about the Parthian empire should be placed in the period within which he made his survey.

Only twice during this period could the Tigris, skirting Mesopotamia, have formed the western limits of Parthian power. Dated tetradrachms, minted at Seleucia, indicate that Tiridates II was in occupation of that region and so probably of parts, if not whole, of Mesopotamia in May, 26 B.C., and again in March, 25 B.C.⁴ In both the months Tiridates II was in revolt against Phraates IV, the reigning Parthian emperor.⁵ A class of dated tetradrachms, minted at Seleucia, also shows that the latter ruler controlled that area before, after and between the two last-mentioned dates.⁶ So only on two occasions within the period in question regions immediately to the west of the Tigris seceded from the

¹ *NH*, VI, 21, 137.

² There are also discrepancies between different citations of Agrippa's opinion about the northern and southern limits of the group of lands under discussion. However, such differences are immaterial for our purpose.

³ The failure of Gallus' expedition in Arabia during the early period of Augustus' rule was at least partly due to the Roman ignorance of the physical conditions of that country (*CAH*, Vol. IX, p. 252). However, it is difficult to believe that in the Augustan Age the top Roman officials were ignorant of the alignment of the Parthian frontier, which was of capital importance to Rome and at the same time which had well-frequented trade routes running along and across it.

⁴ R. H. McDowell, *Coins from Seleucia on the Tigris*, p. 185; W. Wroth, *A Catalogue of the Parthian Coins in the British Museum*, Catalogue of the Coins of Parthia, p. 135; N. C. Debevoise, *A Political History of Parthia* (cited below as *Parthia*), p. 137, n. 45.

⁵ Tiridates II first revolted against Phraates IV even before 31 B.C. and captured the Parthian throne. However, in c. 30/29 B.C. Phraates IV regained his throne. Tiridates II fled to the court of Augustus. A class of dated tetradrachms, ascribed to Tiridates II, indicates that he was in occupation of the region of Seleucia in May, 26 B.C. Isidore's reference to Tiridates' invasion of an island in the Euphrates (*Stathmoi Parthikoi* or the *Parthian Stations*, sec. 1) may be referred to this period, and this may indicate Tiridates II's success in different parts of Mesopotamia and adjacent lands. Regions to the west of the Tigris may have now seceded from the Parthian empire. However, as it appears from the numismatic testimonies, Tiridates II was soon ousted from Mesopotamia. He probably fled to the court of Augustus for the second time. Numismatic evidence suggests that Tiridates was again in occupation of Seleucia in March, 25 B.C. Parts of Mesopotamia may have again been out of the boundaries of the Parthian empire. However, by May of the same year Phraates II had captured Seleucia. Tiridates II was no more heard of. (For the original sources on which the reconstruction of events, given here, is based, see *Parthia*, p. 136, n. 44, p. 137, nn. 45, 46 and 47, p. 138, n. 49, and pp. 135–38).

⁶ R. H. McDowell, *op. cit.*, p. 135; *Parthia*, p. 137, n. 45.

Imperial Parthians.¹ The date of Agrippa's information, embodied in his relevant observation, should thus be placed either in 26 or in 25 B.C.²

It appears that some time in 26 or 25 B.C.³ the Parthian empire, including, *inter alia*, Parthia, Media and Persidae, had the Tigris as its western and the Indus as its eastern boundary. At least some parts immediately to the west of the Indus appear to have been under the rule of the Imperial Parthians at this time. It is well known that in and about this stipulated period a group or groups of Parthians or Scytho-Parthians were reigning in the north-western parts of the Indian subcontinent.⁴ The area of modern Charsada (in the Peshawar district) or ancient Pushkaravati of Gandhāra⁵ and also some regions to its immediate north were included in their dominions.⁶ Their coins, which form the chief source of our information about them, never indicate that they were subordinate rulers.⁷ Hence the territory of the Imperial Parthians on the west of the Indus should better be placed on the lower portions of that river somewhere below the present Charsada area.

According to a statement of Orosius, the Imperial Parthian monarch, Mithridates I, extended his authority up to the Indus.⁸ If this statement is to be believed,⁹ Mithridates I, who reigned from c. 171 to 138/37

¹ It may be pointed out that in the years 42/41, 41/40, 38/37 and 32/31 B.C. autonomous copper coins were minted in Seleucia (R. H. McDowell, *op. cit.*, pp. 184-85). However, since the right to issue autonomous coinage was accorded to Seleucia by the Arsacid dynasty itself, which was withdrawn only in c. A.D. 24, these numismatic testimonies need not necessarily imply Seleucia's revolts against the Parthian empire in the years in question. (*Ibid.*, pp. 131 and 218-19).

² Between 58/57 B.C. and 55/54 B.C. parts of Mesopotamia to the west of the Tigris may have been outside the main body of the Parthian empire on more than one occasion. (R. H. McDowell, *op. cit.*, pp. 215-16; *Parthia*, p. 78). However, since Agrippa could not possibly have begun his survey before c. 43 B.C., and since his knowledge of the western boundary of Parthia could not have been much out of date, his information in question should not refer to the period ranging from 58/57 to 55/54 B.C.

³ It may be argued that if Agrippa had up-to-date information about the Parthian frontiers, why did his observation in question refer to the conditions of 26 or 25 B.C. and not to those of 12 B.C., the last year of his life and consequently the latest possible date for completing his survey? There are two possible answers to this question. Agrippa may have completed his survey by c. 26 or 25 B.C. and not by 12 B.C. However, it should be noted that the map for the depiction of which—in addition to any other reason—Agrippa collected his materials was not finally drawn before his death in 12 B.C. This would indicate the alternative suggestion that Agrippa wrote the section of his memoir pertaining to the Parthian frontiers in c. 26 or 25 B.C., even though some other portions of it were composed after that year. Agrippa may have been engaged in surveying the world for a great number of years. He was not alive to revise his views when the map was finally drawn only on the basis of the design and memoranda prepared by him (*NH*, III, 2, 17).

⁴ E. J. Rapson (editor), *Cambridge History of India* (cited below as *CHI*), Vol. I, pp. 563 f.

⁵ M. Wheeler, *Charsada*, p. 3; *Rāmāyaṇa*, VII, 114, 11; H. C. Raychaudhuri, *Political History of Ancient India* (5th edition), pp. 59 f.

⁶ *CHI*, Vol. I, pp. 571 f.; *Journal of the Numismatic Society of India*, Vol. XVII, pt. 1, pp. 1 f.; *Numismatic Chronicle*, 1965, pp. 109 f.

⁷ See R. B. Whitehead, *Catalogue of Coins in the Punjab Museum, Lahore*, Vol. I, pp. 104 f.

⁸ *His. Ad. Pag.*, V, 3, 16-17.

⁹ According to Orosius, Mithridates (I) conquered all peoples 'that dwelt in the country between the Hydaspes and the Indus. He extended his bloody rule to India'. V. A. Smith identified this Hydaspes with the Jhelum and suggested that the statement of Orosius should indicate Mithridates I's conquest of North-western India (*Zeitschrift der Deutschen Morgenländischen Gesellschaft*, 1908, Vol. LX, pp. 49-72). E. J. Rapson, on the other hand, equated the Hydaspes in question with the Median Hydaspes, referred to by Virgil (*Georgics*, VI, 21), and denied the possibility of any such conquest

B.C.¹ conquered at least a certain portion of the territory on the west of the Indus. The account of Agrippa, discussed above, should then suggest the continuation or reassertion of the hegemony of the Imperial Parthians in the same region, or their conquest of a different area on the west of the Indus.

The *Stathmoi Parthikoi* or the *Parthian Stations* of Isidore of Charax purports to record the halting-stations on the principal overland trade route running through the Parthian empire.² This treatise is generally believed to have been composed towards the close of the first century B.C.³ It, however, does not include any region on the Indus within the Parthian empire.⁴ This may suggest that, if (as it is often argued)⁵ Isidore was not out of date in his information on the Parthian empire, the Parthian rule on the lower Indus, indicated by Agrippa, probably ended by c. 1 B.C.⁶

(*CHI*, Vol. I, p. 568). However, it must be admitted that whatever may be the correct identification of the Hydaspes, the Indus, mentioned by Orosius, cannot be any river other than the Indus flowing, *inter alia*, through West Pakistan or the North-western part of the Indian subcontinent. Hence, we cannot, *prima facie*, deny the possibility of Mithridates I's conquest of a territory on the Indus.

¹ *Parthia*, pp. 19, 26 and 270.

² W. H. Schoff, *Parthian Stations by Isidore of Charax*, pp. 1 f. and 17.

³ W. H. Schoff, *op. cit.*, p. 17; E. H. Bunbury, *op. cit.*, Vol. II, p. 164 and n. 8; M. Cary and E. H. Warmington, *The Ancient Explorers* (1st edition), p. 75; etc.

⁴ *Stathmoi Parthikoi*, sec. 1 f.

⁵ Isidore recorded an incident datable to c. 26 or 25 B.C. (see above n. 20). See also Bernhardy, *Dionysius Periegetes*, p. 496; C. Müller, *Geographi Graeci Minoris*, Vol. II, pp. LXXX-LXXXV; E. H. Bunbury, *op. cit.*, p. 164 and n. 8; etc.

⁶ The history of the activities of the Imperial Parthians in certain regions on the Indus is discussed in detail in our forthcoming publication, *The Imperial Parthians in the Lower Indus Country*.

RESIDENTIAL SEGREGATION AND HOUSING IN A DESERT VILLAGE

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INTRODUCTION

The spatial aspects of life in the urban community have been intensively studied by ecologists (Park, 1925; Burgess, 1927; McKenzie, 1933; Hatt, 1946; Shevshky and Williams, 1949). In rural areas also some investigations have been conducted by Galpin (1915), Seeböhm (1926), Hall (1931) and Mayer (1961). The territorial aspects of life in the Indian village have received some attention from Mukerjee (1950), Dube (1956), Lewis (1958) and Mayer (1960), but this has been more in the nature of incidental reference. The present paper studies the factors influencing the pattern of settlement and housing in the arid zone. It attempts a more intensive coverage of aspects touched rather briefly in some of the earlier studies from this Institute (Bose and Malhotra, 1961, 1963; Bose and Sen, 1963).

The village in which this study was carried out lies in Pachpadra Tehsil, district Barmer, Rajasthan, about 60 km. from Jodhpur. It has a normal annual rainfall of about 200 mm. but this is very erratic. The climate is characterized by extremes of temperature and high wind velocity. The water-table varies from 45 m. to 60 m. The general relief is flat.

The population of the village comprises 405 households of which 126 live in the compact village core and the others in small scattered compact settlements and in dispersed dwellings. The present paper is confined to households living in the village core. Data were collected from the village in 1962. The layout of houses and the caste segregation in the village *abadi* were mapped with the help of a surveyor.

FINDINGS

Residential pattern

The residential pattern in the *abadi* as shown in Fig. 1 indicates the following trends:

(i) Families cluster by caste. Of the 23 castes in the village *abadi*, 20 were found living in compact blocks. Such a territorial grouping is operationally convenient since caste, as the dominant social institution, governs the direction and flow of social relationships.

(ii) There is clustering also of households belonging to the same lineage group, there being greater residential proximity among the more immediate agnates. This is the natural outcome of a social system in which property is divided equally among the sons, all of whom settle in the village itself. Uterine kin and affines influence the pattern of settlement of households when they come to live with their maternal uncles or relations-in-law. Thus in each group there are one or more extended kin groups (Bose and Malhotra, 1963).

(iii) Castes at the opposite ends of the hierarchy rarely live adjacent to each other. Castes low in ritual status such as *Harijans* (caste occupation scavenging), *Bhambis* (caste occupation leather work), *Jattiyas* (caste

occupation tanning) and *Bhils* (caste occupation casual labour and cultivation) always live on the outer fringes of the village. The only exception are the *Dholis* (caste occupation drumming) who were permitted by the *Jagirdar* (feudal landlord) to live near the centre. Such residential location is expressive of the social distance between them and the upper castes. However, also living at the outer fringes are *Brahmins* (caste occupation religious service), *Ghanchis* (caste occupation oil-pressing), *Raikas* (caste occupation livestock raising), *Darijs* (caste occupation tailoring), *Lohars* (caste occupation blacksmithy), *Rajputs* (formerly landlords and cultivators, now only cultivators), *Darogas* (caste occupation serving *Rajputs*), *Nais* (caste occupation hairdressing) and *Sants* (caste occupation religious service). All these castes occupy ranks in the middle and top of the hierarchy. Their location *vis-à-vis* the centre cannot, therefore, be attributed to differential ritual status. There is thus no direct relationship between ritual status of a caste and distance of its place of residence from the centre of the *abadi*.

(iv) The influence of occupation followed is noticeable in the residential location of different caste groups. Agricultural castes (*Jats* and *Purohits*), for instance, and castes raising livestock (*Raikas*) live at the outer fringe or in-between the centre and the periphery as this is more convenient for carrying on agricultural operations. On the other hand, castes whose occupations do not demand much of outdoor life, live near the centre or in-between. *Mahajans* (caste occupation shopkeeping and moneylending) are usually found living in the centre along the main thoroughfare.

(v) The time of settlement in the village also influences the residential location of the caste group. As new settlers come, they usually prefer to settle near their caste brethren or kin, if space is available. Otherwise, they choose some other suitable site. The residence of different lineage groups of the same caste at different places is explained by this factor.

(vi) The increase in number of families beyond the available space at the site of the original settlement has resulted in some spillover at some other suitable sites. This has particularly happened in the case of *Jats*.

(vii) The influence of patron-client relationships and the feudal structure is also evident. Near the house of the *Jagirdar* are the *Darogas* and other ritually high occupational castes. The founder members of almost all these families were brought by the *Jagirdar* when they settled here to meet his socio-religious and economic needs.

(viii) Physical features have also influenced the location of caste groups. The most favourable sites have been occupied by the dominant *Rajput* castes since the *Jagirdar* was a *Rajput*.

(ix) There is hardly any residential mobility within the *abadi*. Almost all the houses are owner occupied. There is no tendency towards changing composition in the absence of forces motivating such change as are found in urban areas.

Housing

Almost all the houses in the village are single-storeyed *kutcha* structures with thatched or tiled roofs. The only exceptions are the houses of *Mahajans* and *Rajputs* who are economically better off and usually have stone houses; a few are double-storeyed. Some of the houses have one or two stone rooms and the remaining are *kutcha* ones. The layout of the houses and their structure are usually dependent upon caste, occupation, economic status, composition and size of family, local availability of building materials, level of technology, and various other social and economic considerations.

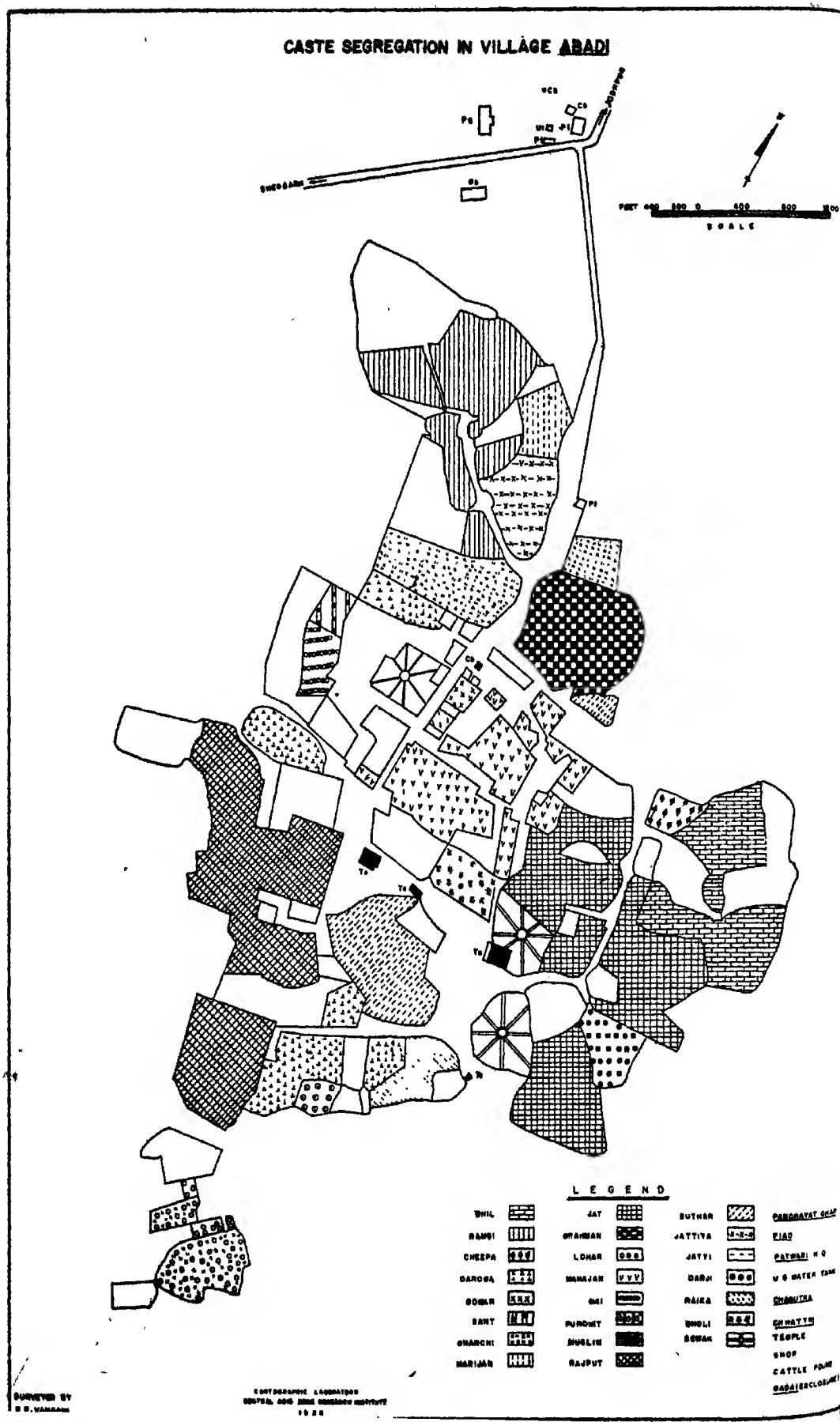
The most imposing structure in the village is the mansion of the former *Jagirdar* of the village. Located at the base of a hill, it is a fort in miniature with its massive stone structure containing horse stables, guest-house, secluded wing for women, spacious halls, servants' quarters, water-reservoirs and a spacious courtyard commanding the view of the 84 villages which were reportedly granted to his ancestors by the ruler of Jodhpur State. The functional importance of the mansion and the awe in which it was held have declined with the abolition of *Jagirdari* and the mansion has ceased to be the centre of administrative and other forms of activities. It is now put only to residential use. The physical appearance of the structure has declined and is symbolic of the fall in authority and activities that once emanated from here.

Government functionaries (*Patwari* and the *Gram Sewak*) living in the village reside in the new stone quarters constructed for them about one furlong away from the village *abadi*. The distance and consequently the feeling of insecurity are reasons why they do not keep their families with them.

The layouts of some of the houses in the village *abadi* were studied. A few specimens are given in the adjoining illustrations (Fig. 2). A study of the layouts shows that:

- (i) The plots are usually irregular in shape with no definite dimensions.
- (ii) The housing is simple and makes the maximum use of locally available building materials and technology. There has hardly been any change in housing design or structure for the last several decades as improved housing does not occupy a high position in the villager's scale of priorities.
- (iii) The courtyard (*aangan*) is usually in the centre and is functionally the most useful part of the housekeeping in view of the climatic conditions.
- (iv) The number of living-rooms is usually related to the economic status of the household, its values, and the age and the sex composition of the members. However, the available space sets the limits to the number and the type of structures that can be put up. There is usually a *jhupa* or *padwa* for each young married couple. Old and middle-aged married men and unmarried men often sleep together. Old and middle-aged women and young unmarried women do likewise. Children usually sleep with their parents or grandparents. The congestion in living-rooms is fairly acute, the only redeeming feature being the open space and courtyard frequently used for sleeping in the summer.
- (v) Occupational castes use a portion of the house, usually a shed near the entrance, for following their crafts and for attending to their clients.
- (vi) Segregation by sex in social relationships is reflected in the arrangement of rooms and their use. People who can afford keep an additional room for receiving guests and visitors. The influence of caste in housing design is noticeable in the greater seclusion of women among castes observing *purdah* as, for instance, in the families of *Rajputs* and *Mahajans*. Separate inner wings cut off from the outer rooms are built.
- (vii) Cattle are usually tied in a portion of the house as a precaution against cattle thefts which are fairly frequent.
- (viii) There is no particular orientation followed by families in the construction of houses for making the best use of light, air or sun. These are built facing the streets which are narrow and meandering with varying width. There are usually no windows. The doors are low and the rooms somewhat dark and stuffy.

CASTE SEGREGATION IN VILLAGE ABADI



SUTHAR		BHAMBHI		DARGA		BHIL	
RELATIONSHIP	COMPOSITION AGE(YRS)	RELATIONSHIP	COMPOSITION AGE(YRS)	RELATIONSHIP	COMPOSITION AGE(YRS)	RELATIONSHIP	COMPOSITION AGE(YRS)
1 SELF	30 MALE MARRIED	1 SELF	30 MALE MARRIED	1 SELF	60 MALE MARRIED	1 SELF	31 MALE MARRIED
2 WIFE	27 FEMALE MARRIED	2 WIFE	30 FEMALE MARRIED	2 WIFE	51 FEMALE MARRIED	2 WIFE	26 FEMALE MARRIED
3 SON	5 MALE UNMARRIED	3 SON	14 MALE UNMARRIED	3 SON	30 MALE UNMARRIED	3 SON	4 MALE UNMARRIED
4 SON	2 MALE UNMARRIED	4 SON	12 MALE UNMARRIED	4 SON	26 FEMALE UNMARRIED	4 SON	1 MALE UNMARRIED
5 BROTHER	16 MALE UNMARRIED	5 DAUGHTER	10 FEMALE UNMARRIED	5 SONS	6 MALE UNMARRIED	5 DAUGHTER	7 FEMALE UNMARRIED
6 MOTHER	57 FEMALE UNMARRIED	6 DAUGHTER	6 FEMALE UNMARRIED	6 SONS	4 MALE UNMARRIED		
7 FATHER	91 MALE UNMARRIED	7 DAUGHTER	2 FEMALE UNMARRIED	7 SONS	2 MALE UNMARRIED		
				8 SONS	2 FEMALE UNMARRIED	8 SONS	3 FEMALE UNMARRIED
				9 SON'S SON	0 MALE UNMARRIED	9 SON'S SON	0 MALE UNMARRIED
				10 SON	24 MALE MARRIED	10 SON	24 MALE MARRIED
				11 SON'S WIFE	16 FEMALE MARRIED	11 SON'S WIFE	16 FEMALE MARRIED
				12 SON'S SON	0 MALE UNMARRIED	12 SON'S SON	0 MALE UNMARRIED
				13 SON	18 MALE UNMARRIED	13 SON	18 MALE UNMARRIED
				14 SON	14 FEMALE UNMARRIED	14 SON	14 FEMALE UNMARRIED
				15 DAUGHTER	13 FEMALE UNMARRIED	15 DAUGHTER	13 FEMALE UNMARRIED

FIG. 2.

(ix) Cow-dung mud coating is extensively used at regular intervals on the walls and floors for maintenance and repairs.

(x) Household conveniences are generally lacking. Several houses do not have even a separate kitchen. Pots, pans and utensils are few and vary with the economic conditions of the family. There is no provision for bathrooms or latrines. Defecation is done in the open. There is no provision for regular cleaning of the village streets or clearing refuse. Household equipments are few. The chief item of furniture is the cot. Lanterns or torches are not found with most families. There is no provision for public lighting so that when the day is over the whole village is enveloped in darkness. Most families retire to bed early and get up early.

The housing is thus rather poor and unsatisfactory. Improvement in housing should be taken up without delay. Suitable adjustments in the boundaries of houses, broadening of streets, drainage, regular collection and disposal of refuse, prevention of defecation at open spaces, levelling of depressions and provision of household conveniences will result in a marked improvement in environmental hygiene. It is also essential to view the village as a part of a region for linking it with a network of communication and community facilities.

SUMMARY

(i) Households tend to cluster by lineage and caste. However, the residential location of different caste groups is influenced by a number of factors like occupation, time of settlement, population increase, patron-client relationships, absence of residential mobility and the physical features of the area.

(ii) The housing is poor and unsatisfactory. The type of housing is influenced, among other things, by caste, occupation, economic status, composition and size of family, local availability of building materials and level of technology.

(iii) For economic and social betterment it is essential to give greater attention to rural housing.

ACKNOWLEDGEMENT

Thanks are due to the Director, Dr. P. C. Raheja, for his guidance and for providing research facilities.

APPENDIX

Aangan (AN).—This is the courtyard of the house, usually centrally located with rooms and other structures on all sides. It serves as the dividing space between the inner room and the outer room like *barsali*, etc. The *aangan* is put to various uses related to household work and for sleeping in summer. When no separate kitchen arrangements exist, a corner of the *aangan* may be used for cooking food. Sometimes calves, goats or other livestock are tied at the corners.

Bada (BA).—This is the cattle enclosure usually at the rear of the house or nearby. Here fodder and fuel are stored, cattle are tied, cow-dung cakes made and agricultural implements, etc., kept. Sometimes the bullock-cart is also parked here.

Barsali (BR).—This is usually a room at the main entrance of the house and is used for receiving or accommodating guests and visitors. It is rectangular in shape with tiled or thatched roofs. Often, at one corner is the *kau* containing ashes of cow-dung cakes where fire is preserved for

lighting tobacco-pipes for common smoking. The *barsali* is rarely used by women. In case the *barsali* is spacious, a part of it is used for storing fodder and grains.

Bhikari (BI).—This is a sort of *almirah* built against one of the walls facing the courtyard. Milk, curd and *ghee* are generally stored in it.

Chhapra (CHP).—It is a *katcha* structure with thatched roofs usually built against one of the side walls. It is completely open on one side and is usually used for storing fodder.

Dais (D).—Raised platform.

Gowari (GO).—Open space in front within the boundary of the house.

Gor (GR).—Cattle enclosure where livestock are kept.

Jhupa (JH).—The *jhupa* is only structurally different from the *padwa* and is put to the same uses, i.e. as the living-room, guest-room, kitchen or store-room. It is almost always a *katcha* structure with a cylindrical base and *katcha* walls about 4 feet high. The top is thatched and conical in shape. There is a sturdy timber pole at the centre. The rest of the framework is made up of locally available branches of trees and shrubs. The *jhupa* is cheaper to construct. It, however, needs frequent repairs.

Kabutron ka chabutra. This is a raised platform generally 5 feet to 6 feet high for feeding pigeons.

Khatror (KH).—This is the workshop of Suthars for doing carpentry and is usually separate from the main house. It is generally rectangular in shape with tiled or thatched roofs.

Kothi (KO).—This is roughly cylindrical in shape with an elliptical top and is usually less than 7 feet high. It is used for storing grain. The *kothi* is sometimes constructed inside a *padwa* or a *jhupa*. When constructed in the open, the top is covered with *bajra* stalks and given a conical shape to give it protection from rain.

Kotha (KA).—This has usually a somewhat larger dimension than the *kothi* and is used for storing clothes, bedding, utensils, etc.

Matha-gaba dhone ki jagah (MA).—This is generally a place at one of the corners of the courtyard or at the back side of the house where a stone slab is kept for washing clothes, etc.

Manjira or Nichara (MN).—This is a place earmarked for cleaning utensils. A small pit is dug for keeping ashes required for the purpose of cleaning utensils.

Ola (OL).—This is a temporary structure built against one of the boundary walls. It has a roof at the top and is open in front or on both sides. It is usually meant for penning cattle.

Padwa (PP).—The *padwa* is a rectangular-shaped room with walls of sunbaked bricks or irregular stone pieces piled over one another and coated with earth and cow-dung. It has an inverted V-shaped gently sloping tiled or thatched roof. The framework of the ceiling is made of timber poles and branches. It has doors but usually no windows. The *padwa* is used as a living-room but is often put to other uses as well, as, for instance, storing fodder or other articles, or for cooking purposes, in which case it is called a *rasora* (kitchen).

Parinda or panera (PN).—This is a narrow raised platform for keeping pitchers.

Pindhariya (PD).—It is about 5 feet high with a circular base, a bulging middle and a conical top. It is plastered on all sides with cow-dung and earth and is used for storing cow-dung cakes. It is usually constructed in a part of the *bada*.

Rasora (RS).—This is the kitchen which, structurally, may look like a *padwa* or *jhupa*.

Than (TH).—This is a shrine. A stone image or picture symbolizing the saint worshipped by the family is placed on a raised platform usually under the shade of a tree.

Thhaan (FT).—Trough, usually *katcha*, for feeding cattle.

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AN ESSAY ON MAN: AN INTRODUCTION TO THE
PHILOSOPHY OF SCIENTIFIC HUMANISM

By SHIBDAS BURMAN

'For all human frailties, pure humanity atones.'

—GOETHE (1827)

'Concern for man himself and his fate must always form the chief interest of all technical endeavors . . . Never forget this in the midst of your diagrams and equations.'

—ALBERT EINSTEIN (1938)

'The most magnificent system of civilization has its own circumscribing limits which it can reach, but not so the human race, for whenever it appears to have attained a certain goal, it is confronted anew with the old challenge to aim for more distant and ever higher objective.'

—THEODOR MOMMSEN, *A History of Rome*

'All love of humanity is bound up with the future.'

—THOMAS MANN

I. The bitter-sweet impact of science on society in our present era has no parallel in history, in shaking to the root our traditional beliefs and mores. From Freud we came to know the ambivalence of human nature, that man has a spark of divinity (in the form of love and compassion) as well as a devilish element (in the shape of hate) in him. Freud conceived the instinctive life as essentially dualistic, with one element—the *Eros* which is the life-affirming principle, and the other one, the *Thanatos*, the death instinct. And he saw, sunk as he was in the darkest depth of nihilism and despair about the future of man, this battle of *Eros* and *Thanatos* playing itself out in the history of civilizations.¹

This is the Freudian analysis as to why the human life is hard to endure. In addition to the discovery of the ambivalence of human nature we have also painfully learnt in the last several decades the ambivalence of major scientific discoveries, including so humanitarian ones as the medical sciences. On the one hand, for instance, it has discovered cures for old sufferings only to create new ones, like the evils of population explosion, putting man to perpetual dilemma—as to what way to go.

Faced with such enigma mankind is in the position of a young man who asks at some moment in his career to which direction progress lies. What answer here science provides? There is a law in thermodynamics—the second law—which is also called the law of increasing entropy. The meaning of this law is that in any naturally occurring system the tendency is in the direction of increasing disorder. The entropy is maximum when the randomness is thorough, after which return to order is virtually impossible. So physics offers us a very gloomy picture—that everything orderly will possibly end, that life with its intricate pattern of symmetries and order shall have its 'in memoriam'.

This lesson of physics has also its poetic analogy from everyday life. To quote Swinburne:

We thank with brief thanksgiving
 Whatever gods may be
 That no man lives forever,
 That dead men rise up never;
 That the weariest river
 Winds somewhere safe to sea.

—*The Garden of Proserpine*

Such is the role of ever-increasing entropy.

But, we should not despair, because a local decrease of entropy is possible in the universe. The emergence of life from non-living inorganic molecules aided by the sunshine is an example of this. Life is a phenomenon in which order is created out of disorder. We may say it *consumes* (that is, diminishes) entropy. As Prof. R. B. Lindsay² has pointed out, the growth of civilization and science itself is this consumption of entropy, since all these are putting order into man's environment. Our growth of social organization and educational system are examples—following the above reasoning—of challenge to the second law of thermodynamics.

From the above examples it may be seen that the fundamental aim of man should be consumption of entropy and thus create order out of chaos. This is the never-ending urge of mankind to put order in his environment, although as history is abound with plenty of instances that man's strifes towards perfection and order were not without heart-breaking obstacles. In times of war we see the reverse of this tendency and in the *milieu* of material destruction and human loss of life we find the increase of entropy—reducing civilization to the elementary chaos of prehistoric life out of which it originally arose. Thus as Prof. Lindsay puts it: ‘... man in his better moments seems to exemplify a ceaseless urge to force some order on his experience. The very existence of science is an example of this. This reflects a conscious desire and involves thoughtful planning limited, to be sure, to a certain small fraction of the population but implying important consequences for all mankind.’²

This is, as Lindsay calls, the *thermodynamical imperative*: That life—in trying to consume entropy—is sacred and must be preserved and richer fulfilment of it should be consciously and willingly aimed. This is essentially a humanistic outlook. The function of man following the thermodynamical imperative may be expressed in Tennyson's words:

I held it truth with him who sings
 To one clear harp in divers tones,
 That men may rise on stepping stones
 Of their dead selves to higher things.

—*In Memoriam*

2. I have written of the inevitable end of all things. The life on earth will be extinguished long long before the sun grows hot and then becomes cold ashes. Following the inexorable law of entropy—some people think that time will some day close the right-hand bracket on my life. In course of advancement in knowledge man has gradually come to realize that we are all born under the sentence of death and that death is the goal of all life. This picture is dismal indeed. But however dark the reality may be, despair is not to be our philosophy. Reflecting back on the history of

life for the last two or three billion years, we notice at once that the history of life has been the one of entropy consumption; or in other words, it is the story—a glorious one—of perpetual challenge to an indifferent Nature. Our task is to be equal to the responsibility we, by virtue of our being alive, have inherited from the past to carry on the progression of life.*

Nature is not so benign, morally uplifting and divine as Wordsworthian pantheism would like us to believe, nor is it wholly true to say that 'misfortune is the principle of the universe' (Thomas Hardy). Rather, one may draw the conclusion to Haekel's question to the universe—'Are you friendly?'—in the answer that Nature is indifferent to man. This conclusion, if true as it probably is, makes the idea of the 'Wisdom and Spirit of the Universe' a more wishful fancy.

The message one may read out from our present understanding of Nature and man's place in it is this: that man must consciously take charge of his destiny, if he is to survive.

In his Lecomte du Nouy prize (for 1959, 'given for the spiritual life of our epoch and for the defence of human dignity') winning books Michael Polanyi analyses that by itself the universe is meaningless, and without any purpose. Purpose was born only with the coming of man. As Prof. John A. Wheeler has put it: 'There are many to whom the idea of a world without any purpose—except what we and our fellow-men agree upon—comes at first as a dreadful shock. Later comes the feeling of challenge; and then at last an inspiration: a feeling that we who felt ourselves so small amidst it all are, in the end, the carriers of the central jewel, the flashing purpose that lights up the whole dark universe'.⁴

There are, besides the fact of the inevitability of death,[†] several other messages which have come out of natural philosophy that goes to show that the universe is indifferent to man; and that contrary to our ego man is not a special creation. There is no divine purpose in his creation as we have just seen and he lives—in one planet orbiting an ordinary star lying in an obscure corner of an ordinary galaxy which again is only one amongst millions of galaxies running away from each other in the lonely, vast theatre

* There is death even amongst Arcadian happiness. The fable of Arcadia and its blissful happiness will be found in literature of many European countries. Arcadia, a region of central Greece, became in imaginations of artists and poets, 'the visionary realm of Love and Beauty, the dream incarnate of ineffable happiness, surrounded nevertheless with a halo of sweet melancholy resignation'.⁵

There is a famous phrase connected with Arcadia, *Et in Arcadia ego*. Its correct meaning, following Panofsky, is: 'Even in Arcadia, there am I.' It is told by Death which is here personified. There are several pictorial representations of the Arcadian theme by Poussin, Guercino, Gerard Honthorst, etc., of the seventeenth century. Fig. 2 (Pl. I) is the famous Louvre painting by Nicholas Poussin drawn around 1640–45. A simple tomb fascinates three handsome shepherds. One of them bends forward to interpret the inscription, *Et in Arcadia ego*, the second one is telling its meaning to a beautiful girl. She is listening to him with a thoughtful attitude. The third shepherd is taken by melancholy. It is as though the youthful people at the prime of life enjoying the bliss of friendship and love, silently thinking over the message of a former fellow-being: 'I, too, lived in Arcadia, where you now live; I, too, enjoyed the pleasures which you now enjoy; and yet I am dead and buried.'⁶ We immediately feel the tragic sense of life, the inevitable destiny of man as well as the transitory sweet things that life offers.

† Freud once doubted whether 'life' is not more primary than 'death'. Death, he speculated, is secondary in nature and came into existence with the emergence of many-celled living organism. Recently, a scientist, H. Dombrowski, reported (International Geological Congress, New Delhi, 1964) the presence of living bacteria from the Paleozoic rocksalt deposits of West Germany. This discovery makes it probable that isolated living bacteria have a geological age as individual living organism. This discovery supports Freud's idea—which he originally derived from studying Weismann, the nineteenth-century biologist—that 'death' is not proved as inevitable effect of natural laws, at least in case of simple organisms like bacteria.

of space and time. Everywhere he finds gigantic, dumb, desolate and inert matter hurrying across the sky knowing not the meaning of its blind destiny.

What lesson do we learn from biology? It is that man is a product—certainly not in the main stem—of accidents of evolution of life, and that our present human state is just temporary. Furthermore, just as life is evolving the universe is itself evolving since it is not static but dynamic.

All these ideas when proposed first were disturbing to man's self-complacency. All these conclusions suggested new problems concerning the survival of mankind.

It is very important to realize the position of man in the evolutionary scheme of life and also to know the fundamental facts about evolution. The mechanism of evolution had been innumerable repetitions of mutations, multiplications and natural selections—repeated over about two billion of years. The mutations are caused by blind chance and the subsequent evolution of forms are left with at the hand of non-human natural forces. These three factors have produced—through innumerable tortuous paths and blind alleys—man. Briefly speaking, two phases were responsible for the evolution of man: (1) the biological phase of evolution which stems from new invention of self-reproducing matter and (2) the psycho-social or cultural phase of evolution which stems from 'self-reproducing mind'.

It may be quite in tune with our discussion on evolution to quote from the end passage of Darwin's *The Descent of Man*: 'Man may be excused for feeling some pride at having risen, though not through his own exertions, to the very summit of the organic scale; and the fact of his having thus risen, instead of having been aboriginally placed there, may give him hope for a still higher destiny in the distant future.'

This hope for a higher destiny can only be fulfilled if, as said before, man takes control of his own fate and endeavours to create greater realization of the society as well as in developing richer individual personality.

As regards the idea of evolving universe perhaps a few remarks may be in place. It is as yet a very controversial debate about the nature of the cosmos. Some say that it is an expanding universe, expanding for the last eight to ten thousand or more million years starting from a very narrow region. On the other hand, others think that on a large scale the universe is static or presents a steady-state appearance. According to this theory the individual galaxies are born and evolve and die (that is, reach the end-stage of their evolutionary history) but the universe as a whole remains much the same as before. Whichever theory we may believe—since there is no clear-cut verdict from observation*—the point is that individual galaxies and stars are born from diffuse hydrogen gas clouds and follow an evolutionary course. The obvious fact—that the sun shines—will not remain an eternal truth since one day it will exhaust away all its nuclear fuel. It is gradually becoming hotter and one day, say some 5 to 10 billion years from now, it will most probably burst into a huge explosion and then the cold ashes are all that will remain. Perhaps, there is some poetic

* Fred Hoyle and J. V. Narlikar have speculated—from the fact of Time's 'arrow', that is, that time flows in one direction only, namely, from the past to the future—that the postulation of a universe which starts from a highly dense phase is not physically valid. According to them, Time's arrow is shown in an expanding universe with continuous creation of matter and constant density. J. V. Narlikar, 'The Direction of Time', in *The British Journal for the Philosophy of Science*, vol. XV, No. 60, pp. 281-85, Feb. 1965.

justification in all these, for from the dust the sun (as well as the earth) was born and to the dust it shall return.

There has emerged in recent years due to Wheeler a new theory of the universe which places man in not a particularly significant position.⁵ This is the geometrical theory of the physical universe, a geometry whose curvature evolves with time. Wheeler thinks that this physical universe consisting of particles and fields, stars and galaxies playing out their drama in empty space may not truly be independent entities engulfed within a static flat space. On the other hand, pure geometry devoid of matter may be all that there is. And this *vacuum*, this matter-free curved space evolves through time following Einstein's general relativity equation.

According to this theory, the curved empty geometry is a kind of 'magic building material' out of which everything in the physical world is made; for instance, '(1) slow curvature in one region of space describes a gravitational field, (2) a rippled geometry with a different type of curvature somewhere else describes an electromagnetic field and (3) a knotted-up region of high curvature describes a concentration of charge and mass-energy that moves like a particle.' The fields and particles with which the physicists are constantly wrestling about are nothing *but*—according to the geometrodynamical analysis—geometry.⁵

During the last generation the scientists discovered that the familiar common table is nothing but the aggregate of tiny electrons, protons and neutrons moving about a space which is mostly empty. This generation of physicists, at least some of them, think that even these by now familiar electrons and protons and neutrons and other similar subnuclear particles are—at the last analysis—nothing but empty geometry, and empty vacuum. In this scheme of the universe (assuming that the analysis is correct) where everything melts away upon reasoning into nothingness, what place man's pride—about his own significance—occupies?

As a postscript to what has just been discussed another speculation concerning the significance of man may be stated. Recent theories on the origin of planetary system like our solar system point to the possibility of millions of planetary systems in which emergence of life is very possible. Out of these millions of planets some of them (although with a much diminished probability than the probability of existence of macro-molecular life) may have hominid or posthu-hominid type of life. This fact again deals a mortal blow to man's Narcissus-like self-complacency.

3. We have analysed, to our dismay, that the physical universe is not specially designed for man (why it is at all existing is a separate question however the answer to which we do not know), and that man is just a product of blind biological evolution—one of the end-product of numerous 'pearlstring of chance events' (Schrodinger). We have also seen that *purpose* and with it human idealism came into being with the evolution of man. Nowhere else except in man can there be found any goal and purpose. This realization may come to us as a shock but, yes, there lies in it the promise of richer fulfilment of human destiny. By consciously taking care of our destiny, we, as a species, can perpetuate the glory that is good life. It is only through gay co-operation that from depths of despair human idealism can raise its flag.

The last point brings to us the need of a new faith, a religion if we may say so, that is—Evolutionary Humanism. This new faith can only be based on our understanding the relation of man and his environment. Man is one of the organisms though in some respects he is endowed with higher qualities. This humanism must be based on the facts of evolution of life and matter.

In what follows now I quote extensively Sir Julian Huxley, who is the exponent of this mid-twentieth-century religion. Thus he says in the essay, *The Humanist Frame*:⁶

'Such an Evolutionary Humanism is necessarily unitary instead of dualistic, affirming the unity of mind and body; universal instead of particularist, affirming the continuity of man with the rest of life, and of life with the rest of the universe; naturalistic instead of supernaturalist, affirming the unity of the spiritual and the material; and global instead of divisive, affirming the unity of all mankind. *Nihil humanum a me alienum puto* is the Humanist's motto. Humanism thinks in terms of directional process instead of in those of static mechanism, in terms of quality and diversity as well as quantity and unity. It will have nothing to do with Absolutes, including absolute truth, absolute morality, absolute perfection and absolute authority, but insists that we can find standards to which our actions and our aims can properly be related. It affirms that knowledge and understanding can be increased, that conduct and social organization can be improved, and that more desirable directions for individual and social development can be found. As the overriding aim of evolving man, it is driven to reject power, or more numbers of people, or efficiency, or material exploitation, and to envisage greater fulfilment and fuller achievement as his true goal.'

'Most important of all, it brings together the scattered and largely unutilized resources of our knowledge, and orders them to provide a new vision of human destiny, illuminating its every aspect, from the broad and enduring sweep of cosmic process to present-day politics, from the planetary web of world ecology to the individual lives entangled in it, from the dim roots of man's past to the dawning possibilities of his far future.'

As you see from the above passages this new vision of human destiny is fundamentally an evolutionary one. This emergent religion believes in knowledge. This new faith is anti-God, anti-conventional religion, but is also pro-facts, pro-truth and pro-man. It suggests the fact that 'truth is great and will prevail, and the greater truth that truth will set us free' (Julian Huxley). It will set us free from beliefs in supernatural entities and superstitions, and set free our energy and time to realize the incredibly new possibilities that still lie in the depth of time's mystery. At the main stream of this new vision of man's fate is, in Nietzsche's words, 'a will to truth at all costs, a youthful madness in the love of truth'. This Scientific Humanism encourages man to scatter the seeds of science and song and it stands for man's love for light and life. It tells you that 'Life delights in life' (Nietzsche).

Sir Julian Huxley has discussed the humanist view of the three most important activities of man which are besides those of living, namely—art, science and religion. According to his broad definitions, art is defined as covering all organized expression of experience in aesthetically effective form, science in the meaning of organized knowledge, and religion includes 'all systems of belief and morality primarily concerned with the problem of destiny'.

All these three activities are possibly united in the words of Coleridge: 'The primary imagination I hold to be the living Power and prime Agent of all human perception, and as a repetition in the finite mind of the eternal act of creation.' Art is a process of discovery of life and of ourselves. It recognizes that the value of man lies 'precisely in that he belongs to the two

kingdoms, of nature and spirit. It will realize that no romantic conflict or tragic dualism is inherent in the fact; but rather a fruitful and engaging combination of destiny and free choice. Upon that it will base a love for humanity in which its pessimism and its optimism will cancel each other out'.⁷ Such is Thomas Mann's vision of new humanism in which he sought to unite man's daemonic element with his superbiological or spiritual worth.

Art can become an instrument of escape from the dull routine of modern life into a world of mind and quality transcending material existence. Art, along with science and literature, can provide an imperfect appreciation of the ultimate fusion of goodness and beauty and truth in one supreme vision of which Plato dreamed in the *symposium*. Plato's myth was that originally human nature was one, then it became divided into two, into man and woman. After the division each part is forever trying to seek each other out. The following words he puts in the mouth of Diotima:

'He who would proceed in due course should love first one fair form and then many, and learn the connexion of them; and from beautiful bodies he should proceed to beautiful minds, and the beauty of laws and constitutions; and from constitutions he should go on to the sciences, until at last the vision is revealed to him of a single science of universal beauty, and then he will behold the everlasting nature which is the cause of all.'

Many centuries have rolled by since Plato, but the vision—because the wake is hard and tortuous—is not yet attained. But the new faith—scientific humanism—is constantly trying to unite the partial images of reality through science and literature and art. Art is trying to increase the qualitative richness and colour of the man's sensitivities, while science is endeavouring to increase the volume of knowledge.

Julian Huxley has described in his essay *The Humanist Frame* how art can play an important role in education. Most young children can develop their little personalities by expressing themselves creatively through painting or clay-modelling. By this they try to understand the changing flux of external world in their creations as well as they can extend their selves in the universe that lie outside their physical selves.

In some instances art can also help restoring the mental balance in an individual and prohibit him from becoming neurotic, that is mentally deranged. It can also assist in recovery from a neurotic breakdown.

'Art is hope.' True art is love, the love of humanity which is bound up with the future of the species. We see this expression of self-love of humanity in daily life, to cite an ordinary instance, in efforts to beautify the public places, gardens, mansions, etc.

In discussing about art and its cultural possibilities I feel tempted here to briefly mention about an instance of interrelationship between art and mind. I am referring to the famous essay by Sigmund Freud⁸ (1914) on the Moses of Michelangelo. In this famous study of the Biblical hero, Moses, Michelangelo tried, according to Freud, to rouse in us the same 'mental constellation' which prompted him to create the figure (Fig. 1, Pl. I). Freud's study of the Moses reveal the inner strivings of an artist; the giant figure with great physical power portrays an expression of 'the highest mental achievement that is possible in a man, that of struggling successfully against an inward passion for the sake of a cause to which he has devoted himself'. Freud's interpretation, if correct, shows the violent force of will in the artist with his possible premonition of its failure; thus, in self-criticism the artist has risen higher to his own nature.

I have brought this instance of study of Michelangelo's art to show the depth psychology of a creative artist. Once we fully understand the relation of art to psychology, we will then grasp better the psychosocial or cultural potentialities of art and the best methods to realize them in practice.

I shall bring here another example of art trying to complement man's understanding of the universe. The scientific account of the origin of life is an endeavour to explain the evolution of cellular structures and multicellular organisms from simple chemical compounds with the help of the broad principle of change and transformation with time—Goethe's metamorphosis—of one thing into another. And Science writes this story as if with the 'cold finger of a starfish' (R. L. Stevenson). It is probably all true... But what about the ecstatic feeling, the passion, that we experience through our life and art? Is not the artistic element in us also able to comprehend the incomprehensibility of nature?

Perhaps, art can. And in doing so it raises us above the level of our being, raises us from occasional falls into the darkest depths of our nihilism. True art tries to transcend this morbid despair. Figure 3 (Pl. II) shows a photograph of 'Verbum' which represents the principle mentioned above—artistically and, perhaps, more elegantly. In the centre is the word 'Verbum'. In the six corners are depicted land and sea, by night and by day. One may easily see from the photograph how one thing is gradually changing into another; for instance, fish is becoming frog, frog is being transmuted into bird. This principle—which Goethe, von Humboldt and Charles Darwin taught us as the fundamental truth of life—is probably also the very *essence* of the whole cosmos itself. If so, a great insight into nature is won.

I have tried to show through the first example how art may help communicate the mood or the psychological forces in an artist, and in the second one how art tries to give meaning to our existence. In the future society based on scientific humanism, art will have a complementary role to play with science; while science is trying to know more and more about the eternal mysteries of the universe, art—controlled by intellect—will try more and more to bridge life and mind. In such a society art, in endeavouring to express human hope, will aim at a 'happily balanced humanity'—the vision of the great artist of life, Thomas Mann. Mann never lost hope on the redemptive power of art. In an essay on Chekhov, one of his last two pieces of composition, he expressed the hope that one day mankind will be prepared for a better life as the human spirit will become free by truth and serene form. The poet's task is to give form to truth.

Thomas Mann's faith in art reminds the present writer of Tolstoy's answer to a question which puzzled him for many years: *What is Art for?* In one winter evening, with the ground being covered with intense snowfall, Tolstoy was having a walk with three schoolboys on his estate at Vasnaya Polyana. As the boys were interested to hear stories Tolstoy narrated them a tale about a Cossack brave who, being surrounded by his enemies, broke out into a song and put his dagger into his body. Tolstoy went on telling other stories but the incident about the Cossack brave left the ten-year-old Fedka thinking. After some time Fedka, who was thinking all along, suddenly jumped from the terror of murder and asked Tolstoy: 'Why does one learn singing?'

Tolstoy had no immediate reply. He only asked the boy: 'Why do you draw well? Why you write well?' Fedka again asked: 'Yes, why to draw well?' In fact the child was searching for an answer: *What is Art for?*

All his life Tolstoy thought over this question—on the mysterious connection between beauty and violence, between art and life, between

love and death—which these children instinctively knew. Thirty-seven years later, in *What is Art*, he answered Fedka's problem in three sentences: Art is a means through which the evolution of feeling proceeds; all men have access to art; and violence can be set aside by art. Thus, Tolstoy realized—as Plato did when in *The Republic* he wrote about music and gymnastic as civilizing the wildness of passion—that art enjoys the unique function of uniting all men into a brotherhood, thus fostering the well-being of individuals and of humanity.

Next, we come to science. It is, broadly speaking, the process of discovering and organizing knowledge. It enables one to predict (within a margin of uncertainties) future and gives power to man to mould the environment to suit his need. Albert Einstein used to believe⁹ that knowledge of what *is* does not entail us to what *should* be. But the scientific humanists—with an understanding of the past history of the globe and of the universe—try to picture definite goals of human aspirations. We hope that our splendid knowledge of the truth may give us the power—notwithstanding Einstein's scepticism—to guide us. Several writers including J. Bronowski, Michael Polanyi, H. Bentley Glass and Lord W. R. Brain have tried to find an ethical basis of science. Science's claim to have a morality of its own stems from its continuous search for truth. On this basis these writers have tried to construct a foundation for human ethics also.

For, after all, science is the process of continuation of gradually increasing awareness of organisms to its milieu. At first, there was probably nothing. Then there was the inorganic universe. Then came the living matter. The environment in which these live are called biosphere. The next stage was set up with the evolution of mind giving rise to a new sphere of reality, the one in which man finds himself, namely, de Chardin's *noosphere* (meaning mental sphere). Man has his being with one foot in the biosphere and the other one in the noosphere. This noosphere is rapidly increasing with the growth of knowledge. Who can foresee the possibilities of man in the domain of noosphere a million or a billion years hence? Reverting back, could any amphibian some four hundred million years ago ever imagine the splendid realization of life's potentialities now?

Looked at from the evolutionary angle of view science is seen as not merely recording of facts, but also, as J. Bronowski has stressed, creation of new entities, just like the creation of concepts like *atom*, *evolution*, *electromagnetic field*, *mutation* etc. In this it is alike creative art and creative literature. Science searches behind the phenomena of facts a system of relatedness. As Herbert Dingle states in his essay, 'Some Reflections on the History of Science', 'amid all the changes of theories and pictures and conceptions, the relations remain and steadily accumulate'. In trying to discover hidden relations between phenomena, science progresses. It is in these relationships that the beauty in science lies.

Just as science creates beauty, it also creates *value*. Science is a human activity and like all activities of man it entails value-judgments. Admittedly, the science of value-judgment has not yet come into its own, neither it is widely recognized that science is not ethically neutral. One hardly knows much about the interactions of psychological forces which gives rise to the result—the conscious feeling of value. Ethical values are as *real* entities as atoms, for these exist in human mind; and mind with its intricate awareness of existence is part of the physical universe.

Not by discourses on hair-splitting philosophy or guidance from religious dogmas that the understanding of value will be achieved. On the other hand, the value-goals, the knowledge of what should be, may be reached

—so the scientific humanists think—by rational studies of the interaction of the world outside the individual with the microcosmos within his body and mind. The full scientific interpretation of values may be possible when we have known the history of evolution of mind and have been able to interpret consciousness in the light of biological evolution.

Science—in fostering values—creates human worth. At a time when the highly specialized modern civilization, spendthrift of its grandeur, is on the point of going down by the Nemesis which it has itself created; at a time of evergrowing tempest of despair and pessimism, let us understand with a sombre feeling that 'in creating human worth'—in the words of the young Norwegian poet, Nordahl Grieg, who was killed in a bombing raid on Berlin during the Second World War—'we are creating peace'.

The problems of value and ethics are intermixed. Ethics is not a body of fixed and immutable principle dictated by any God, but is a part of reality and, as a product of evolution of society, is itself evolving. As Evolutionary Humanist believes in nothing absolute, ethics also cannot be viewed as having any absolute value, yet, as Julian Huxley has said, 'ethics are relative to a process which is both meaningful and of indefinitely long duration—that of evolutionary progress'.

In Man, the Universe, we may say, has become conscious of itself. And along with it evolution may be regarded as no longer a blind process. Whether we like it or not, the responsibility and scope for further evolution have fallen on the shoulders of man. With man as its lantern-bearer, evolution is gradually becoming conscious of itself, like the universe. At this point when evolution is trying to free itself from chance events that ethics is injected into its process. Thus writes Julian Huxley (1943)¹⁰: 'Before man that process was merely amoral. After his emergence onto life's stage it became possible to introduce faith, courage, love of truth, goodness—in a word moral purpose—into evolution. It became possible, but the possibility has been and is too often unrealized.'

Perhaps, it may be proper here to enquire into the origin of first ethical principles. Two of the ethical principles are 'Thou shalt love thy neighbour as thyself' and 'Love thine enemies'. Though Christianity parades itself that these precepts are its own ethical creations, these commandments were in existence long before Christianity came into being. These two principles, which seem to be arbitrary and go beyond common sense, were shown by Sigmund Freud in his book, *Civilization and its Discontent*, to originate when men started forming groups or societies. Freud had pin-pointed the shocking truth—when the mask of hypocrisy is taken out—that men are not friendly creatures wishing for love, who simply defend themselves if they are attacked, but that they have a strong aggressive spirit. This tendency to aggression troubles our relations with our neighbours and makes it imperative for culture to institute its high demands. *Civilized society is perpetually menaced with disintegration through this primary hostility of men towards one another.*' (Italics mine.)

Sir Arthur Keith speculated¹¹ how in course of human evolution man acquired his two dominant instincts, love and hatred. The fundamental concept of Keith's theory of evolution of *homo sapiens* is the idea of 'groups'. These groups had their own gene pools and in isolation from the rest of mankind ran through their own evolutionary development. When the population in the group increased they needed more territory to support them and had inevitably to come into conflict with the neighbouring groups. In these group-conflicts in the early history of mankind that we can see the origin of aggressive instincts.

A further remark will presently be made on the differentiation of instincts. When our prehuman ape-like ancestors left aboreal existence and came out to live in the open ground, they saw themselves surrounded by many ferocious enemies. As a protection against these the aggressive instincts came into much use and consequently were gradually developed. Again in analogy with the style of life of baboons we may assume that the early men moved in groups, just as the baboons move in social groups. (The range in baboon troupe size shows a variation from 9 to 185.¹²) For the cohesion of groups fellow-feelings or love came consequently to be developed. Thus love or libidinal instinct makes for group cohesion while the instinct of destruction or aggressive instinct plays its part in conquering new territory and in victory over alien people.

In Sir Arthur Keith's theory the further march of evolution was thought to be carried on by the victorious group only. But this is not completely true. There is always gene mixture between the victorious and the vanquished which influenced their further evolution. This genetic mixing between the conqueror and the conquered is also shaping the destiny and evolution of nations and classes. Karl Marx tried to establish a theory of historical determinism. He saw history as class struggle motivated by considerations of economy. But what he missed to see is the biological basis of classes (C. D. Darlington¹²). The difference that distinguishes the social classes can arise from genetic factors. This leads, to follow the idea to its logical conclusion, to the superiority of governing classes because of their better genetic endowment. Like Marx, Arnold Toynbee also tried to erect a theory of historical determinism. History, he saw, as a process of *challenge* of the environment and *response* to the challenge. Toynbee, like Marx, put the full responsibility of historical development to environment. He, too, missed to see the biological foundation of the events he studied. At our present state of knowledge the relative influence of these two factors as well as the role of individual and environment in the interpretation of history is not, however, much known. But, as Darlington has stressed, any interpretation of history should be supplemented with knowledge of the biological facts of life.¹³

4. Having made a short journey into the interpretation of history, we now come back to our discussion on civilization and also to an interpretation of mankind's oldest *illusion*—religion. Civilization, as we understand, originated in man's need for social security. In civilized society the individual is in conflict because of two trends which are not always in the same direction: one, towards personal happiness, and the other, towards 'unity with the rest of mankind'. Thus the two processes of cultural (culture is used synonymous with the word civilization here) and individual developments contend with each other.

In another essay, namely, *Beyond the Pleasure Principle*,¹⁴ Freud speculated that in addition to *life instinct* there is inherent in the organisms a *death instinct*, which marks a tendency to return to the inanimate nature. This death instinct is related to the aggressive instinct. In fact, when the latter one, instead of being directed to outside object, turns inwards, it then gives rise to the death wish.

The stark reality about man is that the tendency to aggression is an innate instinctual disposition with him, and there lies—as Freud has shown—the main obstacle to culture. Freud's theory of civilization is in contradiction to Spencer's optimism on human progress although both the minds are the products of the impact of Darwinism on philosophy. With the ever-increasing complexity of civilization, the individual's burden of instinctual renunciation becomes more and more critical. When it crosses

the threshold of endurance the moral rules are set at bay and the nations indulge in the practice of wrongdoing and war.¹⁵ The repressions are inevitable in a civilized society under the present stage of human evolution, which Freud confessed in a letter to Einstein; these repressions made the idea of a peaceful world community impossible.¹⁶

To dwell a little further on civilization and war, I quote below Freud's remarks expressed with a touch of artistic beauty:

'The natural instinct of aggressiveness in man, the hostility of each one against all and of all against each one, opposes this programme (the works of Eros, "which aims at binding together single human individuals, then families, then tribes, races, nations, into one great unity, that of humanity") of civilization. This instinct of aggression is the derivative and main representative of the death instinct we have found alongside of Eros, sharing his rule over the earth.' And now, it seems to me, the meaning of the evolution of culture is no longer a riddle to us. It must present to us the struggle between Eros and Death, between the instincts of life and the instincts of destruction, as it works itself out in the human species. This struggle is what all life essentially consists of and so *the evolution of civilization may be simply described as the struggle of the human species for existence.* And it is this battle of the Titans that our nurses and governesses try to compose with their lullaby song of Heaven!' (Italics mine.)

This 'struggle of the human species for existence' was also beautifully described by R. W. Emerson: 'Wherever snow falls, man is free. Where the orange blooms, man is the foe of man.'

We have seen that civilization or culture grew out of man's necessity to lead a secure social existence. But, in order to combat the destructive impulses, man created the religious commandments, like 'Thou shalt love thy neighbour as thyself', etc. Faced with natural forces superior to man, he created God in his own image and then attributed these credos—which are, in fact, the outcome in course of evolution of society—to Him. This had an unfortunate effect; the God-fearing religious-minded people could be restrained in outletting their aggressive elements for fear of incurring His wrath. But, if the illusion of religion is unmasked by the cold logic of reason and people are told about it, then there is a possible danger culture may have to face from the oppressed and suffering multitude: knowing now that God does not exist or that 'He is dead', people won't feel moral restraint to kill neighbours to avenge social injustice. To avoid this possibility, there is this way out—that masses must be educated, which in itself of course is a stupendous task and brought up to the level of the modern age, and also alongside fundamental changes have to be wrought as Freud concluded in the relationship between religion and civilization.

How to save civilization from its own destructive forces and effect peace? This question has become crucial now since the discovery of atomic and bacterial bombs which threaten to annihilate all lives and bring the earth to a state of cosmic peace. But this sort of peace majority of men will not, however, desire. The answer to the above question is by no means simple, or else we would have it on earth long before. All solutions ultimately must find out conditions for creating human worth for creating peace. Freud suggested in 'Why War?' the formation of a superior class of free thinkers,* who would not be amenable to force and be zealous in the

* The World Academy of Art and Science (An Agency for Human Welfare), Rehovot, Israel, may be regarded as such an institution of free thinkers that Freud dreamed.

quest of truth, whose function will be to guide the masses. To achieve this—realizing the difficulties created by politicians and religious leaders—he suggested one to subordinate his life of instinct to a life of reason.

What we have called destructive instinct is akin to the *love of excitement* since both are generically related and both can be traced back to originate during or even before the hunting stage of early man. This love of excitement induces man to go to hunting, to dance halls, cinemas, etc. What is serious about excitement is that many of its manifestations are destructive, for instance, when the love of excitement leads to war. It is in these activities that man does not act from the motive of self-interest alone. Therefore in his *The Nobel Prize Acceptance Speech, 1950*,¹⁷ Bertrand Russell stressed that 'pain should be taken to provide constructive outlets for the love of excitement. Nothing in the world is more exciting than a moment of sudden discovery or invention, and many more people are capable of experiencing such moments than is sometimes thought'.

There are also other ways to transfer and sublime the aggressive instincts (1) by directing it to study Nature with science and arts as tools, (2) by cultivating international (local) games and sports. Play thus plays a very important biological role for the survival of man. There is also a third possibility in the form of unification of mankind through international marriages which is discussed in a later section of the essay.

As we have seen civilization and religion are intimately related, so considerations on civilization should be complete if we pay similar ones on religion also. Freud¹⁷ had shown how religion originated from the necessity of defending oneself against the superior forces of Nature, and that the religious instincts are related to the longings of a helpless child for its father to stand by him. Thus he writes, 'his longing for a father is a motive identical with his need for protecting against the consequences of his human weakness. The defence against childish helplessness is what lends its characteristic features to the adult's reaction to the helplessness which he has to acknowledge—a reaction which is precisely the formation of religion' (page 20).¹⁸ This analysis leads to view religion as 'the universal obsessional neurosis of humanity; like the obsessional neurosis of children, it arose out of the Oedipus complex, out of the relation to the father'.

A point about religion should be stressed here. Psychoanalysis only tried to give psychological reason behind religious feelings; it has not proved that religious sentiments or the mystical feelings like 'the flight of the alone for the Alone' are hoax. There is probably a true 'religious feeling' when man tries to wonder at the eternal mysteries and tries to find an answer to several of his questions which are truly unanswerable. There end all sciences and begin philosophy and religion. These questions are: Why this universe exists? How was it originated? Is existence essential? Why this life exists? and finally what is the significance of human life? We do not know the answers. We may not know these ever. All we can do is to accept the facts as they are like Carlyle's lady who accepted the universe.

But, accepting the universe is not enough. As Julian Huxley has said, 'We must learn to accept it, and accept it and our existence as the one basic mystery.'

Evolutionary Humanism, which may be regarded as the new religion of mankind, shall have to have this background of sombre awe in the face of the above-mentioned eternal riddles, the enigmas which to some people give rise to 'oceanic feelings', that is, the feelings of limitless and unbounded sensations. It shall also suggest man—while he tries to reason out the

essence of things—the ways to deal with his many-fangled problems of existence and keep alive his sense of marvel.

In Scientific Humanism, art, poetry, science and religion try to form means to grasp the universe, however imperfect the apprehension of it may be. Goethe came to this idea when he wrote:

He who has Science and has Art,
Religion, too, has he;
Who has not Science, has not Art,
Let him religious be!

Thus in humanistic approach in religion it tries, along with art and science, to deal with the relation of man with the rest of the universe and with himself as well as evolving an ethics of behaviour of man with fellow-man and human society. In such a programme there is no waste of energy in trying to solve the unsolvable problems of the other world. But, on the other hand, in trying to concentrate on life in this world, in striving to make each day better and happier than the previous one, we can make this earth worth living into. Then, with pleasure, one will be able to say, with the German poet Heine: 'We leave Heaven to the angels and the sparrows.'

In Evolutionary Humanism we believe and deal with the notion of progress which is essentially dynamic. Together with this we—in Scientific Humanism—believe in life itself! In this view of life man tries—in course of his march through billows of events—to have his own happy union with the ultimate fusion of the Trinity of goodness, truth and beauty in one majestic vision. It is a great debate—ranging till now from the time of Heraclitus and Parmenides—in the history of thought whether in Nature there is only ceaseless evolution of form (Heraclitus) or whether there is an absolute, fixed, reality—timeless and ultimate (Parmenides). We have not tried to seek an answer to it for it may be that the true answer may always lie in the abyss. But, as Sir Cyril Hinshelwood has said,¹⁹ at least the later one is not the world in which life must be lived. In the former view of nature—according to which one thing changes into another with the passage of time and in effect gives rise to new qualities—science and the humanities come closest to complement each other: art, in trying to give colour and richness to life, and science, in striving to bring structure and coherence to the transitory events. As Oscar Cargill has remarked, 'A world of change and flux . . . is the only world in which art and science have any immortality.' In such a world, and in the realm of the adventures of ideas which spring from such a cosmos, the dichotomy between science and the humanities tends to annihilation. And when we have been able to erase out the dichotomy, may we then exclaim with Goethe who was versatile in both the arts and sciences:²⁰

Natur und Kunst, sie scheinen sich zu fliehen,
Und haben sich, eh man es denkt, gefunden;
Der Widerwille ist auch mir verschwunden,
Und beide scheinen gleich mich anzuziehen.

(Nature and Art: no sooner do they seem to flee each other than they come together. In me, too, the antagonism has disappeared, and they seem to attract me both equally.)

5. In the foregoing discussions I have tried to trace the origin of Evolutionary Humanism within the perspective of the great universe. I have also endeavoured to find a unity of thought and purpose in man's life to the formulation of which Scientific Humanism may have a say. Science

has been pictured to describe reality dispassionately. This may be true. No science has ever been, and perhaps science may never be, able to explain the heart-beats and tears rolling down the cheeks when one listens to an old song, or recapitulates a far-away memory, an event as if belonging to another world. The irrevocableness of the past—just because the past does not strive after life's 'fitful fever of never-ending desires'—causes pain in the heart which in course of time becomes like pearls. Materialistic causes may be invoked to explain these, but we know they are so off-the-mark that these don't really satisfy the heart.

It is possible therefore that the efforts of explaining phenomena in terms of other phenomena—mental or physical—are deficient in grasping the First Cause. It is exactly here that philosophy begins, for in philosophy there are only great questions, but no answer.

But, here a paradox originates. Science may never be able to find an ultimate explanation of things, but nevertheless it is creating material advances in gigantic steps. For instance, the physicists' comprehension of an electron is shadowy just as the electron itself may be, but on the other side of the picture we have marvellous advances in electronics. Again, although we have our being in space and time, it is quite possible²¹ that space and time do not exist in microphysical domain.

Whatever the ultimate nature of reality may be, the fact remains that science has advanced our material culture and civilization tremendously and no ultimate limit is apparently visible which science may not achieve. In the remaining part of this essay, I shall try to focus on the recent strivings of science towards improving the material conditions of life; in particular its guidance towards human evolution—both biological and cultural. As we shall see, recent scientific discoveries, and the discoveries yet to be made, are continually bringing up fresh ethical questions. I shall also touch upon these questions in short.

6. I begin this section with an article of faith, that is, I believe in the reality of evolutionary progress up to the time of writing. Living in the second half of the twentieth century I do not, however, share the unbounded optimism of the French philosopher, Marquis de Condorcet, who, in the midst of the French Revolution, explicitly set forth—in his *Historical View of the Progress of the Human Mind*—the idea that human progress is continuous and will persist till mankind reaches perfection. There are people, on the other hand—perhaps a major portion of mankind—whose countenance shows the twilight of life and vanishing of all thoughts of pleasure and beauty and hope and truth. As an example of such people Leila, wife of the central character Said, in Jean Genet's *Les Paravents* says to him thus: 'I want you—it's my ugliness, earned minute by minute, that speaks—to be without hope. I want you to choose evil and always evil. I want you to know only hatred and never love. I want you—it's my ugliness, earned second by second, that speaks—to refuse the brilliance of darkness, the softness of flint, and the honey of thistles.'

Events of the next few years will decide who is right—the pessimism of Jean Genet's heroine or the cautious optimism of mine. All history has led mankind to a precarious existence at the present moment. We cannot foretell who will triumph—Truth, or her enemy Hypocrisy. But, one thing is sure; for the stars in the midnight sky proclaim it: That Life is hope, and that hope's arrow is towards progress.

Prof. C. H. Waddington has brilliantly advanced the case for evolutionary progress in his *The Nature of Life*.²² He has argued that the term progress is given to the transition from simple forms of life to the much more elaborate kinds such as the mammals which appeared in the earth's history

in relatively recent period. Some people, however, argue that for these cases of transition the term progress should not be given. They even argue that it is man who thinks that transformation from worm to philosopher is progress, but not the worm. To this one may like to reply with Waddington: 'We will take seriously the worm's claim to be our equals when the worms come and present it, but not before.'

There is, however, no certainty in the belief in progress. Waddington has argued that evolution tended towards complexity and further that complexity is good because it may have survival value. For instance, by evolving temperature regulatory mechanism and by taking more care of the infants the mammals definitely scored an edge over the reptiles in the struggle for life. Again the most important factor in the evolution and subsequent domination of man has been the growth of his forebrain and the mental activity connected with it, intelligence. But what guarantee is there that this very intelligence producing knowledge may not bring disaster to the human race? Knowledge, if it is not tempered with the will to goodness and the feeling for humanity, is to be feared. The black cloud causing fear is already looming overhead.

At this juncture of history we need hope as never before and a new faith to guide us. This new assurance may be had from Scientific Humanism. Along with more faith we need more of wisdom which is the Trinity consisting of knowledge, will and sentiment. Knowledge is growing and will continue advancing. Old knowledge has brought deadly weapons. New knowledge may bring deadlier ones. This dangerous possibility we have to remember and face with courage. In no case one can barter away the freedom of thought—although some of these thoughts may produce dangerous knowledge—for mere survival. It is for this freedom to think that we may draw encouragement, that Galileo, Copernicus and Bruno suffered. That's why I agree with the veteran thinker, Vannevar Bush, that 'our simple survival is not worth so much that it is to be purchased at the cost of intellectual stultification'.²³ If we are not to make sorry figures of ourselves we have to let the flag of free-enquiry stay raised overhead. We must never, however, forget that this precious freedom that I am championing here necessarily brings in its trail an obligation to enhanced responsibility.

7. The hope of future lies in the freedom of thought. New knowledge, new ideas—gleaming out from the dusk, like stars shining from a clear, dark sky—will come from the infinity of human spirit. These new ideas originate in the stirrings of mind, because there is an infinity in man which makes him so restless and so unhappy. The new knowledge will in turn suggest ways to betterment of both the human nature and the environment. For the evolution of man both *nature* and *nurture* play complementary and significant roles. Already we know many of the theoretical concepts by the application of which humanity can be improved. I shall here indicate only a few of these for the ideas are floating—so to say—in the air and are accessible to any inquisitive mind to pluck.

These ideas which today we are imagining have the potentialities of great material improvement. To these Holderlin's poetic diction is true: 'Like the eagle before the thunderstorm foreboding flies the bold spirit before coming gods.'

Back now to some of these 'eagle-like' ideas (spirit)! The further evolution of man can be carried out by two processes. One method is called psychosocial or sociogenetic (that is, cultural method) way of human evolution. This method has been suggested by Julian Huxley who rightly claims that man will evolve by sharing his knowledge with fellow-man.

The important tools for transmitting certain types of acquired characters are by the processes of education and mutual instruction.

Education occupies the central position in modern civilization. Thomas Henry Huxley in the last century lifted up his voice in favour of mass education because he rightly thought that 'the people perish for lack of knowledge'. His grandson, Julian Huxley,²⁴ treated education as a social process and has looked at it in the perspective of evolution. The picture that has emerged about human destiny from the evolutionary vision is this: that man is a part of Nature, and must live in responsible partnership with Nature instead of exploiting her most irresponsibly as at present. We must stop being a gang of robbers exploiting as much as we can from Nature without at the same time trying to conserve her resources. We must leave the arrogant idea of 'conquering' Nature and base, for instance, the economic policy on utilitarian considerations rather than on profit motives as is now done in all the countries.

In a narrow space on this essay on man it is not possible to discuss in detail Huxley's suggestions as regards education which I broadly share. I will rather point the reader to his admirable essay. I shall take, however, an opportunity to note his thought on the educational systems of underdeveloped countries because of its importance to India. His suggestion is equally applicable for developed countries also. Huxley writes: 'During education at all stages, stress should be laid on biological science, notably physiology and its applications in regard to health, and ecology and its applications in regard to conservation and land use, rather than on physics and chemistry and their application in technology.* It may be pointed out that the present educational system is based largely on physical sciences and in laying the foundation on biological sciences Huxley aims to swing the pendulum farthest. It may be a drastic course to take, but that when a balanced stage will be reached both the approaches will have equal share in promoting human welfare.

The survival of any nation depends vitally on and conditioned by education. 'The educated mind is the guardian genius of democracy', as Mirabeau Lamar's famous saying goes. If democracy is to succeed in the scientific age, then as Eugene Rabinowitch has pointed out in the essay, *Science and Humanities in Education* (1958), there will be a growing need for the public and political leaders alike ability to exercise sound judgement in situations dealing with technical or scientific facts. This will require a general education in science by all men and women to enable them to make a proper choice of experts, not on the basis of their political opinions and shades but because of their competence. There is another merit in scientific education, besides the fact that science places before man a vast perspective of time and space and the forces moulding the stars and atoms; it is that modern science teaches man to live in a world of probabilities and possibilities. It teaches one, as Rabinowitch pointed out, to be open-minded, and to have a relativistic and complementary approach to truth and to discard the world of absolute certainties. Bohr's complementarity principle could be applied not only to the concepts of wave and particle but to the human situation also—as between different cultures. This sort of attitude is what is needed in today's world of discontent.

It is important to point out here that in devising educational programmes due cognizance should be taken of man's great genetic diversity as remarked by Ernst Mayr. Equality of opportunity—that is what democracy means—necessitates variations in education. There is no equality of opportunity

* Personal communication.

unless environment is varied. As the British historian, H. G. Wells, remarked: 'Human history becomes more and more a race between Education and Catastrophe.' Being restricted by space, I shall just stop here with only this remark: the purpose of education should be to teach one, not what to think, but how to think. And there must remain no place for dogmas of any sort in educational programmes as it should be, in fact, within the humanist's frame as conceived by Huxley.

If we are to achieve welfare state or Huxley's 'Fulfilment Society' one of the goals of education should be, while emphasizing the human ecological approach, to bring into sharper focus of all sections of public the ever-growing danger of population explosion. In old days population used to fluctuate about a roughly average number which is not possible nowadays due to advances in medical sciences. While medical discoveries have advanced many philanthropic causes they have also reaped some disadvantages to our species by holding in check the processes of natural selection. It is, therefore, quite possible that mankind has tended to degenerate under civilized conditions. On the other hand, the diminution of the intensity of natural selection, even if it is only a transitory phase, has freed us from the ruthless struggle for life. With the ever-growing increases of population this diminution of natural selection cannot be permanent. If the present rate continues—because people in general are by no means sapient—the stark reality of Nature's way will once again be apparent: the ways of war, famine, pestilence and death. Even now in the literature and life of the twentieth century the agony is evident as when Hemingway comments in his *A Natural History of the Dead*: 'I do not know, but most men die like animals, not men.'

8. In the preceding section we have noticed the sociogenetic or cultural mode of human evolution. This method of evolution is far more rapid than the biological mode in which genes transfer information from generation to generation. Although the cultural method of evolution is far more rapid than the genetic method of the same the later one has still an important part to play. It is wrong to underestimate the role of biogenetic evolution.

Even before the modern principles of genetics were known men carried on successfully the biological reshaping of plants and animals successfully. Men must try to improve their nature along with the environment. So long efforts were and are mostly to improve the material condition, that is, the environment of man. These do not foster permanent benefit because all is lost as soon as the conditions change. Therefore, positive attempts should be vigorously undertaken to improve human nature by improving his heredity. In fact, as Hermann Muller observed,²⁵ 'men would indeed be ignoble if they, Narcissus-like, worshipped their present selves as the acmes of perfection, and reserved their efforts to bring about genetic betterment for their cattle, their corn, and the yeast that gives them beer'. Some men, however, will leave such smugness of attitude and will endeavour to see their ideals put into corporeal form. Such men will have as their aims the improvement of the race both genetically and culturally.

Discussing the prospects of genetic progress Muller reasoned how man's present genetically determined constitution bears the imprints of style of life that he led since the time of his emergence from his prehuman ancestors. Compared to the evolution of early men the evolution of modern men is characterized by the merging of innumerable number of small isolated social groups. The possibility of mankind splitting into different species has been very much lessened and will remain so as long as the technological civilization endures. For the technological culture favours interbreeding by

breaking geographical isolation. This diminishes multiple chances of success which intra-group selection offers. Moreover, whatever intra-group selective processes remain, these processes, observes Muller,²⁶ 'tend to preserve and in some ways even to aid the multiplication of characteristics that are disserviceable to the welfare of the group as a whole—that is, of the species'. Thus, it looks that further amplification of technological culture to which we are leading will bring ultimate extinction of the human race.

There is only one way left to effect the survival of the species; it is by using cultural interference and making conscious use of his foresight.

Muller has discussed many ways by which biological improvements can be effected in man. The first and fundamental step that is to be taken in directing future evolution of man is checking population explosion. The world is already overpopulated. The population should at first be brought down to an optimum size, which is much less than the present figure, after which genetic improvements can be carried through. Here we will have to face the question: Does the declaration of universal human rights entail the right to unlimited reproduction? The answer to this question—in the context of global rise in population—is a definite and firm 'No'. Man should feel enlarged social obligations in relation to the perpetuation of the species, rather than take glory in maximum number of offspring he produces regardless of quality.

This increased awareness of social responsibility should enable one to see that it is harmful, in the interest of the human race, to reproduce defective—physically and mentally—children. Just as we seek advice in case of our health problems similarly we should seek advice when it concerns the vital question of reproduction. We should observe some humility if—in the interest of the posterity—we find in us some shortcomings—physical, temperamental and intellectual. In that case we should forego reproduction but still will be able to find satisfying social and other work. For an extensive discussion on the above and on other related matters I refer the readers to the interesting article by Muller, *The Guidance of Human Evolution*. Commenting further on how many children exactly a person should have, we can say that there is no hard and fast rule concerning it looking from the point of view of his genetic constitution. Because such precision is not necessary for natural selection and there is any excess number natural selection will take care of itself. Moreover such precise predictions are not much possible since the determination of the developed traits will be complicated by environmental influences. Hence, taking a long-term view we should be satisfied if the trend is in the desired direction. And this trend—which protects and tends to improve his genetic materials—should always be sought.

On the basis of the above arguments Muller has treated the problem of ethical values. Many of our higher values—like wisdom and co-operative behaviour—are both culturally and genetically determined. The possession of these values has placed man in a superior position in the animal world and it also helps survival of individuals and societies which cultivate these. In all possible ways, genetically and culturally, our endeavour should be to attain increased fellow-feeling and higher intelligence.

9. Now we discuss a few of the positive measures to effect the genetic improvement of the human race. The most important factor in the evolution of mankind has been his intelligence, that is, the capacity to learn. There are evidences that intelligence is genetically determined.²⁷ In any planning on human improvement two factors should be constantly remembered: one, that leadership in science, technology and arts comes from

very few exceptionally gifted individuals; secondly, a small increase in the average intelligence—and the average intelligence of human race is painfully too low—will shift a little the spectrum of distribution of intelligence in the population. This slight shift, however, will mean a large increase in absolute number of gifted people. The benefits resulting therefrom will then be very considerable.

According to the recent literature²⁸ the frequency curves of intelligence of two widely distinct groups—like the Europeans and the Indians for instance—overlap over almost the whole of their extent. This means that both the groups have almost half of their population genetically stupider compared to the other half. Basing on these findings we may take the following measure for the genetic improvement of the species: to initiate interbreeding between the genetically elite-halves of the different groups or races of mankind. This method will not only help furthering growth of intelligence of the human race but also will be a very powerful factor towards the unification of mankind. This will reduce intra-group struggle for dominance for power which is at the root of major crises of war in the present stage of history. The desirability for such international marriages was never so acute as now.

What we need today is the widespread awareness of the various biological factors influencing the destiny of mankind and then to base our social policies in the light of our new knowledge of eugenics. To solve the 'storms' in the history of our species we should all stress, as Sir Julian Huxley pointed out in the important Galton Lecture in 1962, 'the need for planning the environment in such a way as will promote our eugenic aims'. Many of our present-day social policies and philanthropic measures are increasing the probability of genetic regression and degeneration.

Many factors are working today towards increasing this probability: (1) the artificial radiations from atomic and nuclear blasts are mostly adding up the genetic load and (2) the economically less favoured classes are producing more offspring than the more favoured classes in many countries. Both these factors have done damage to man's genetic equipment. Since we have realized these new dangers it is up to us to reverse the process by both educating the whole section of people and byconcerting efforts.

Huxley and Muller have suggested various measures, some of which can only be undertaken through international agencies such as the U.N. and its specialized agencies like the F.A.O. and the U.N.E.S.C.O., the World Bank, etc. For example, let us consider the population problem. It is quite imaginable that some countries will strive to check their population, while there may be countries which do not believe in such things. In that case in the long run people who are not controlling population will try to push into the territories of the nations which are controlling their number. Such efforts on the part of nations not practising population control will inevitably lead to war and what is more deplorable will put them in advantageous position. Thus it is seen that the United Nations should make population control in the world its major item of work and shall decide the optimum number of people the nations should have.

Practical difficulties can be foreseen in implementing such a programme. A nation may decide to go ahead with its own whims without paying any attention to the advice of the U.N.O. If that is so, should the U.N.O. enforce its policy by force? Such unpleasant things can be avoided if the nations show prudence and a standard of morality equal to individual's standard of morality. It is often seen that groups, like say religious fanatics, indulge in brutalities which none of the individuals comprising the group will indulge in when he alone acts. The important problem is:

How to enhance group-morality to the level of individual morality? Man must solve this if he is to survive.

Coming to some of the possibilities opened up by modern science, we can see its progress in achieving positive eugenic results, like sterilization of defective people, artificial insemination donation, etc. Again, technical advances are now in process of perfection about deep-freezing of spermatozoa and also ovum. These will tremendously help to better man's genetic future if only we show enough broadmindedness and enlarged social obligations.

Another method that leads to the eugenic ends is the one of encouraging assortative mating, as suggested by Frederick Osborn.* The term is used to describe the tendency of marriage partners to resemble one another as a result of preference or choice. Assortative mating, which tends to segregate the population into different genotypes, can, in association with natural selection, be an important factor in improving the hereditary abilities. Again, recent understanding of the role of genetic determinants has opened up the possibility of control of mutational processes, in the design and synthesis of genetic determinants as well as the innovation of methods for the introduction of new genetic determinants into the genome of living organisms (E. L. Tatum, 1963).† Such potentialities might bring in the wake of their realization new moral dilemmas about the application of science such as was experienced when controlled fusion energy was released.

10. In this essay on Man, I have tried to sketch in brief the many-fangled possibilities of genetic and cultural improvement of the human race although one may not share^{29, 30} a spirit of optimism which is my faith about the ultimate results looking to a long-time interval. Whatever may be the result—and whether one believes in progress, no matter what may have been the accidents of life, as I do—the modern scientific discoveries have, in addition to material change, brought some serious conflicts regarding ethical values and mores of society. These values are derived from cultural evolution and ultimately may have biological basis. I shall here bring only one problem, that is the subject of crime. Before we try to punish a criminal we should ask ourselves the question: How much is the criminal responsible for the crime he has committed? The answer to it is not at all simple not only because we have to have a unique answer to the problem of free will versus determinism, but also for the reason that crimes may have biological basis. If that is so, then it is the responsibility of the parents who caused the mating of the offspring who later became criminal rather than the criminal himself. After all, what justice is if one has to suffer for the mistakes of his parents? The society also ultimately has to share the parents' responsibility for the reason that it helped the parents to marry.

The problem of moral laws, crime, justice and ethics is very complicated indeed and although the unique answer to this problem may not be easy to seek, still we should not lose sight to cultivate the spirit of objective scientific attitudes to it. We should not debase science and lose confidence in it for science represents the level best of our understanding

* Frederick Osborn: 'Absolute Weapons—The American Reply' (*unpublished*) (reply to R. A. McConnell's article, 'The Absolute Weapon', published in June, 1961; issue of the *Bulletin* of the AIBS).

† E. L. Tatum: 'Genetic Determinants' in *The Scientific Endeavor*, Centennial Celebration of the U.S. National Academy of Sciences. The Rockefeller Institute Press, pp. 208–216 (1963).

about the world around us and the cosmos within us. Science is perpetually searching the objective truth. We are cultured and civilized just because we value truth and we know—rather it is an article of faith with us—that truth shall make us free.

At the source of this essay lies the realization that Truth is great and that she shall make us free. In the course of our tortuous journey through the universes of life and matter comes a feeling that there is only one truth and, within the limits of each, both the humanities and science attain it.³¹ Scientific Humanism, by honouring truth, is to act as a bridge over the abyss lying between life and mind. The central problem in Western philosophy had traditionally dealt with the conflict between the two concepts, life and mind, that is, between Schopenhauer's *Will* (life) and *Idea* (mind). Schopenhauer, the metaphysician of the German Romantic Movement—as it occurs in all romanticism—downgraded the Intellect while at the same time he exalted the instinctive side of man. Nietzsche in the *Birth of Tragedy* exalted life over thought, but in the following years he changed his mind and thought became to him the only important aim. In *The Magic Mountain* Thomas Mann—Schopenhauer's intellectual heir—showed how the Will in the end got better of Idea. It seems, however, following Neils Bohr, that the antagonism between Will and Idea, between volition and contemplation debated since the time of the Greek philosophers, is not fundamental but that they bear to each other complementary relationship. The existence of similar complementary relationship between matter and life was also postulated by him. Bohr, moreover, pointed out, when he approached the old problem of the foundation of ethical values, our confrontation with the complementary relationship inherent in the human situation as when we discuss the concepts such as justice and compassion. It was for long known since Confucius the great difficulty to mete out justice to one who is at the same time also loved. Such confrontations remind us that we are all actors and spectators, whence may originate the feeling of tragic sense of life in the drama of existence. This new ideal—in fulfilling the spiritual faculty in man—is to make him free. In seeking this freedom all humanity is in the position of the poet Robert Herrick who received the following letter from one Doctor Gehring, his friend:³²

‘You are full of splendid possibilities and you are to remember that I have told you that *just because* you are not satisfied with yourself is the unmistakable sign of the “spiritual faculty” within you, striving to be freed. Follow the furrow now, since you must, but lift up your eyes and let your soul “Sing of arms and the heroes”! The power of an ideal, to lift, is the greatest thing in human life.’

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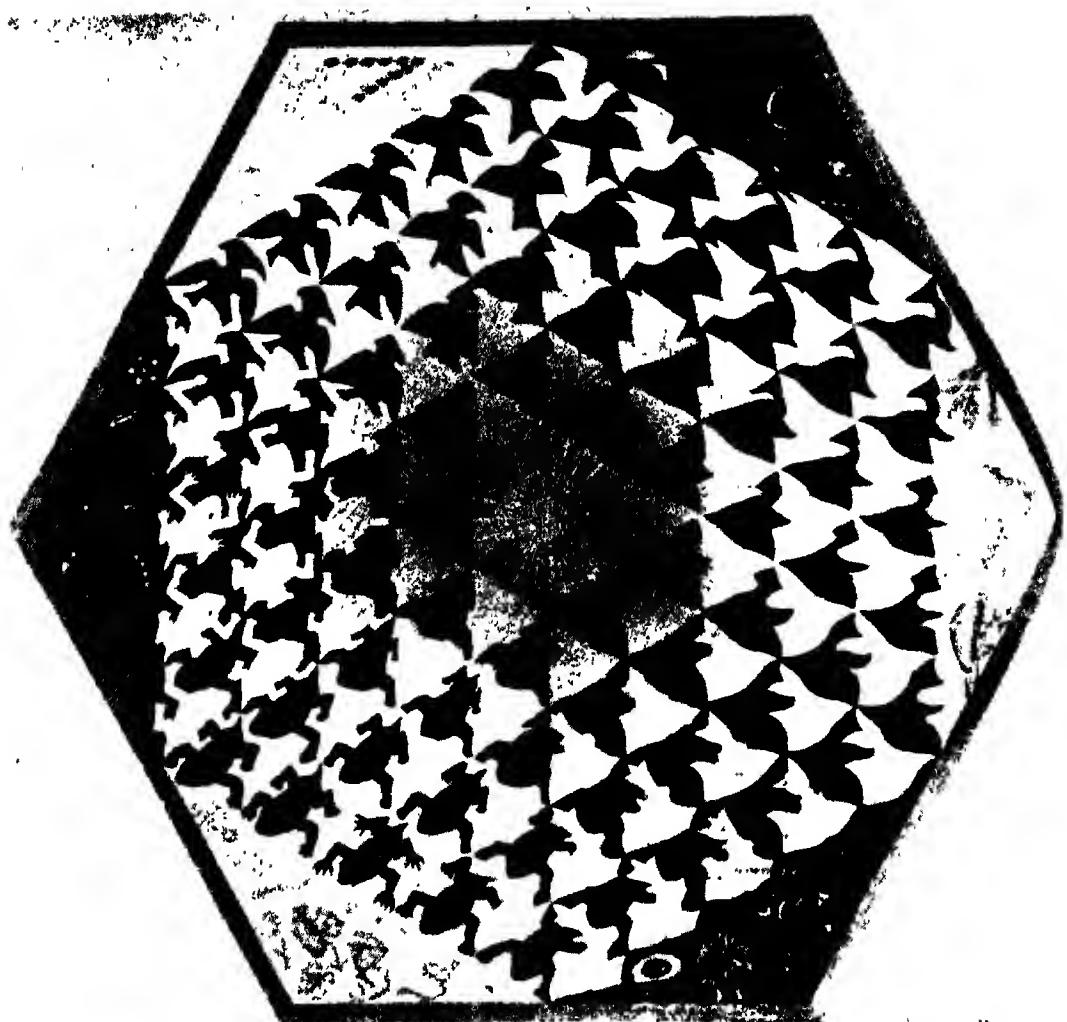


By courtesy—Life Magazine (c) 1964 Time Inc.

FIG. 1. Moses by Michelangelo



FIG. 2. Nicolas Poussin's famous Louvre painting
(*Et in Arcadia ego*)



By courtesy Professor M. C. Escher

FIG. 3 'Verbum' M. C. Escher

REVIEWS OF BOOKS

ROLE OF ORIENTAL STUDIES IN THE HUMANITIES. New Delhi, 1964.
Pp. 56.

This is the proceedings of a symposium held at New Delhi on 6th January, 1964, on the occasion of the Twenty-sixth International Congress of Orientalists. This small booklet reproduces, in full, the inaugural and the concluding addresses of Professor Humayun Kabir, the Chairman, and the speeches of Professors S. K. Chatterji, J. Filiozat, A. Palat, A. L. Basham and Norman Brown. A very brief reference is made, in a single page, to the observations of Dr. Buddha Prakash, Dr. K. Hüber, Shri P. N. Pushp and Dr. A. A. Güber.

The hope aroused by the subject chosen for the symposium is belied by the speeches, as they mostly repeat the trite observations on the relation between the East and the West, formerly regarded as two opposing and conflicting worlds in life and thought and now conceived as integral parts of one human culture. Dr. S. K. Chatterji, after an elaborate historical review in course of which he emphasized the role played by *Pax Mongolica* —a rather new historical conception difficult to understand—deplored the ‘tacitly though thoughtlessly admitted barriers between Oriental Studies and General or Western Humanities’. Animated by a strong desire ‘to combine these two halves into a single whole’, he held up before the learned assembly the vision of a mighty array of the great minds of the West and the East (citing about 30 individual names from Homer to Rabindranath, in addition to the generalities like Christian Fathers, Vedic seers, Chinese and Japanese Nature Poets, Zen Masters and others of Asia) who ‘must join hands to form a corpus of World Humanism, irrespective of the West and the East’. The only practical means to achieve this noble end, in his opinion, ‘would be to prepare graded compendia for all sections of students, in schools, colleges and universities, where the message of “Orientalism” may reach the West, and that of “Occidentalism” the countries of the East’. One may be pardoned for doubting the practical value of this suggestion and may well refuse to regard the ‘new course started in Columbia University’ ‘an easy way’ to achieve the object.

Professor Basham was the only speaker who struck a somewhat original note. He disagreed with the view expressed by other speakers ‘about the task of the Orientalist in bringing about peace and brotherhood by explaining the civilizations of Asia to the West’. He rightly points out that the scholars engaged in interpreting abstruse Oriental texts like the *Rigveda* ‘can in no way be motivated by the desire to strengthen human brotherhood and his work contributes only infinitesimally to that noble ideal’. He denies that deeper knowledge necessarily leads to deeper fellowship and suggests that ‘We must strive not merely to know, but to understand and love’. But ‘one can only love individuals, not cultures and civilizations, and a sincere friendship between an Asian and a Western, or vice versa, does’ ‘more to cement the bonds of human brotherhood than a thousand Orientalists working in their studies’. Such a speech was sure to prick the bubble in the whole show.

Professor Norman Brown’s plea for the practical value of Oriental Studies in modern age is really a plea for the study of the history of mankind, as he indirectly admits when he refers at the end to the teachings of history solving ‘our besetting problems of today’.

On the whole, it may be doubted whether those who attended the symposium were much wiser when they left it, about the role of Oriental Studies in the Humanities.

R. C. MAJUMDAR

DEMOCRACY IN NEFA. By Verrier Elwin, with a Foreword by P. N. Luthra. North-East Frontier Agency, Shillong, 1965. Pp. xi+195. Price not mentioned.

The tribal communities of NEFA have been progressively coming under the administrative system of India. In many places, they retain their tribal organization of government and of the administration of justice, though these are sometimes in a mutilated form. Dr. Elwin always pleaded that the tribal councils should be made use of, as far as possible, in matters relating to government and economic development.

In the present book, he collected information on the councils in vogue among the Monpa, Sherdukpen, Aka, Apa Tani, Dafla and other tribes. Case after case has been presented, either from Dr. Elwin's own observation or from the work of several research officers working under his guidance.

The book is very readable, and gives us a glimpse of the rational and sometimes irrational motivations which lie at the root of tribal ethics and custom. It will be a useful book of reference.

NIRMAL KUMAR BOSE

DACCA THE MUGHAL CAPITAL. By Dr. Abdul Karim, Reader in History, Dacca University. Asiatic Society of Pakistan Publication, No. 15, Dacca. First published December 1964. Price in Pakistan Rs.20 ; Abroad 40 shillings or \$7.50 (U.S.A.).

The role of Dacca in political history and its architectural remains have received a fair share of attention from scholars. But the book under review presents an altogether different line of approach.

Dr. Abdul Karim, the author of *Social History of the Muslims in Bengal*, *Corpus of the Muslim Coins of Bengal* and *Murshid Quli Khan and His Times*, has told 'the story of the rise and fall of the Mughal capital, the part played by Dacca in the Mughal administrative system and the economic factors leading to her rise and fall'. The theme is extremely important and interesting and the work throws light on administrative and economic history of medieval India and especially of Bengal during the seventeenth and eighteenth centuries.

The book, together with a bibliography and an index covers 514 pages besides the preface, abbreviations and table of contents. Out of these, six chapters tracing the story of Dacca which contain 108 pages and 13 appendices cover 389 pages. There are five maps showing:

- (i) Subah Bangalah according to the *Ain-i-Akbari* (1582).
- (ii) Environs of Dacca (1765) after Rennell.
- (iii) The demarcation between pre-Mughal and Mughal Dacca.
- (iv) City of Dacca and its Cantonments (1859).
- (v) European Settlement in Old Dacca.

The select bibliography refers to the sources and books used by the author in the preparation of the volume. These are of six categories:

(a) Persian and Urdu works. Among these are Persian chronicles and memoirs like the *Akbarnamah*, the *Ain-i-Akbari*, *Tuzuk-i-Jahangiri*, *Baharistan-i-Ghaibi*, *Iqbalnamah-i-Jahangiri*, *Mirat-i-Ahmadi*, *Fathiyya-i-Ibrigya*, *Siyar-ul-Mutakherin*, *Tarikh-i-Bangalah*, *Riyaz-us-Salatin* and others.

(b) Manuscript records of the India Office Library, London, viz. Bengal Revenue Consultations, Bengal Board of Revenue Proceedings, Board's Collection, Diary and Consultations of the Dacca Council (i.e. Dacca Factory Records and Dacca diaries of Rankin), Bengal Public Consultations, Home Miscellaneous Series, Proceedings of the Dacca Provincial Council and Secret Consultations, etc.

(c) Documentary printed works, like *English Factories in India*, Ascoli's *Final Report of the Survey and Settlement of Dacca*, Firminger's *Fifth Report*, *Diary of William Hedges*, Hill's *Three Frenchmen in Bengal*, Hunter's *Statistical Account of Bengal*, S. Master's *Diaries*, etc.

(d) Voyages and travels like those of Manrique, Bernier, Bowrey, Manucci, Tavernier and Bishop Heber.

(e) Other modern works, and

(f) Journals.

The six chapters are as follows:

Chapter I deals with an introduction (Name of Dacca): After discussing the origin of the name Dacca, the author discusses the geographical features and hydrography of the city and concludes that considerations of strategy and commerce weighed with Islam Khan Chishti in favour of transfer of the capital from Rajmahal to Dacca (Jahangirnagar).

In *Chapter II* the chronology of the Nawabs of Dacca (1608 to 1712) has been discussed as well as that of the naib-nazims from 1717 to 1843.

Chapter III traces the growth of the city of Dacca. In discussing the forces contributing to its growth, the author has described the part played by governmental establishments as well as landed and commercial interests. The 'golden period' of the city started from Shaista Khan. The situation of different localities of Dacca has then been discussed.

Chapter IV describes Dacca as administrative headquarters. The capital accommodated the Subahdari and diwani establishments. The jurisdiction and administrative machinery of the Dacca niabat has been explained with reference to *sair* collections.

In *Chapter V*, which describes Dacca as a centre of trade and commerce, the author has expressed the view that 'the most important fact to contribute to the growth of Dacca as a commercial centre was the establishment of *Shahbandar* there by the Mughals'. He has then described the emergence and activities of different foreign traders—Asiatic, Portuguese, Dutch, French, the English. Finally, he has pointed out that 'Dacca served a double purpose in relation to the country's commerce—(a) the town as a manufacturing station and marketing place and (b) the port as a place for receiving and despatching both country and imported goods' (p. 79).

Chapter VI gives a picture of the economic life of Dacca. After trying to estimate the population of Dacca during its peak period of growth (about 4 to 5 lakhs), the author has tried to analyse the occupational groups of the people and assess their economic condition from the points of view of the general wealth of the city and the living conditions of the people. Lastly, he has referred to the vexatious currency system with 16 denominations of coins inculcating in Dacca, which was referred to by James Steuart in his *Principles of Money Applied to the Present State of the Coin in Bengal* (1772).

These chapters are based on the above-mentioned classes of sources supplemented by Inscriptions and Coins. Rennell's Atlas has been used for topography.

The appendices deal with selected manuscript documents on the early part of the East India Company's administration in Bengal relating to

Dacca out of the vast mass preserved in the India Office Library (now Commonwealth Relations Office), London. The author studied these during 1960-62 as a Commonwealth scholar under the Commonwealth Scholarship and Fellowship Plan, U.K. These appendices are on the following topics:

- (1) Account of receipts in *hats*, *bazars* and *ganjes* at Dacca, (2) Account of settlement of *khamar* (spirituous liquor) *mahl* at Dacca, (3) Muhammad Reza Khan's account of Dacca revenues, (4) List of dependent *chaukis* of the Dacca *Shahbandar*, (5) List of dependent *chaukis* of the Tobacco *mahl*, (6) Dacca Collector's letter and *sair*, (7) Rate of taxes collected in the *Shahbandar*, (8) Average price of goods at the Dacca market, (9) Rate of average taxes collected in *hats*, *bazars* and *ganjes* of Dacca, (10) Accounts of daily collection of duties at the *Shahbandar*, (11) Register of *Rawanahs* issued by the *Shahbandar*, (12) Description and inventory of the house of Zahur un-Nisa, *zamindar* of Gangamandal, (13) Price of commodities at the Dacca market in the eighteenth century.

These appendices throw light on the Mughal administrative and economic conditions in Bengal before 1765 and are likely to be extremely valuable to discerning and painstaking scholars working on this period, especially those who have no access to the India Office Library. It is, however, a tough job to extract useful economic details from the dry list of bewildering figures. It is expected that Dr. Karim would give his own analysis for the benefit of the general reader in the next edition. The get-up and printing is good. One would have wished some of the maps to have been clearer.

J. N. SARKAR

MADHURA SANGITA OF PARASURAMA RAY. Published by the Visva-Bharati. Edited by Sri Amitabha Chaudhuri. Royal quarto. Pp. 311 and 64.

The book under review publishes for the first time an account in verse of the love exploits of Radha and Krishna, a popular theme of Vaisnava poets, by Parasurama Ray. It naturally falls into the Vaisnava group of Bengali poetry and judging by the merits of the book under review the author deserves a place among the major Vaisnava poets. The style followed is like that adopted by Krishnadas Kaviraj in his *Chaitanya Charitā-mrīta* which, as the name shows, is a biography in verse of Shri Chaitanya. The main text of that book has been written in Bengali but it is supported by copious quotations from Sanskrit books. The same method has been adopted here.

The book has been edited by Sri Amitabha Chaudhuri, the distinguished journalist. The task had been assigned to him early in the fifties when he was a member of the teaching staff of the Visva-Bharati and it is a point of satisfaction that it has been at last completed. The reading is based on two old manuscripts recovered from different places, one from Cuttack and the other from Birbhum district. According to the Editor the poet belongs to the seventeenth century although the two manuscripts bear much later dates, namely 1166 B.S. in the case of the one recovered from Cuttack and 1193 B.S. in the one recovered from Birbhum district.

The text is preceded by an introduction which is fairly substantial running into 64 closely printed pages. It covers all essential points concerning the book and includes subjects like biographical data of the poet, the date of the book, its subject-matter, literary merits, principal characters

etc. The quality of editing is high. The text, however, suffers from a blemish. The Sanskrit verses quoted in the body of the text are full of mistakes. It appears from the editorial notes that this is due to the fact that the original manuscripts had been copied letter for letter and word for word without correction so far as the Sanskrit quotations are concerned. It is noted that this has been done deliberately although the Bengali text has been subjected to a different treatment by substituting correct forms where mistakes were detected. Had the Sanskrit text been also corrected, that would have definitely enhanced the value of the present publication.

HIRANMAY BANERJI

BHĀRATIYA SĀDHANĀR DHĀRA. By Dr. Gopinath Kaviraj. Royal quarto.
Pp. 200. Published by the Sanskrit College, Calcutta.

This is a collection of essays from the pen of Dr. Gopinath Kaviraj, the distinguished Indologist. They had appeared in the past in different journals in all cases except one. Our work will be facilitated if we start with an account of the contents of the book as well as the different occasions on which they were first published.

The book has been divided into three parts. The first part deals with the four schools of Vedanta other than the *Advaitavāda* of Sankaracharyya. They are the *Visistādvaitavāda* of Ramanuja, the *Dvaitādvaitavāda* of Nimbarka, the *Sudhvādvaitavāda* of Vallabhacharya and the *Dvaitavāda* of Madhvacharyya. All the five systems are based on the *Brahmasūtra* but naturally fall into two broad groups, the *Advaita Vedanta* of Sankaracharyya forming a group by itself and the others falling in the second group. Sankaracharyya's philosophy is abstractly monistic, while the others leave scope for a monotheistic conception of God. For this reason these four schools of Vedanta allow themselves to be grouped together as Vaishnava schools of Vedanta literature. The author has adopted this grouping. A chapter has been devoted to each school for systematic treatment. They give an account in turn of the cosmological theory propounded, the method of self-realization prescribed and of the exponents of the school. It appears that they were written for publication in a series in consecutive issues of the magazine named 'Uttarā' of Kasi. The object was obviously of a limited character confined to an exposition of the essential features of each school. That perhaps explains the synoptic character of these chapters.

The second part deals with two important schools which stemmed out of the Tantric form of Mahājāna Buddhism. They are the *Sahajajāna* and the *Siddhajāna*. Both are more or less allied but have minor differences in tone. Both elaborated a system of Yoga based on appropriate theories which have for their objective the attainment of the natural state of being technically called *Sahajābsthā*. Hence the name *Sahajajāna*; this is conceived as three places removed from the ordinary perceptual stage of subject-object contact. It is beyond even the stage of *Ānanda* and something which is indefinable. This part of the book was published in the same magazine which had earlier published the matter reproduced in its part. The subject is abstruse but has been very ably handled, as should be expected from a scholar of the stature of the present author.

The third part was originally published as the introduction to the translation of the *Tika* on the commentary of Sankaracharyya on the *Brahmasūtra* known as '*Ratnaprabhākara*'. It gives a chronological account of the different exponents of the *Advaita Philosophy*, both preceding and following Sankaracharyya. It is a brief but comprehensive survey of

all exponents of this school. The author gives an account of the theory propounded by each one of them and leaves it to the reader to judge how they differ from Sankaracharyya's view (p. 169). It is a useful compilation to draw clues from for all scholars interested in the Advaita Philosophy.

The compilation will no doubt enrich the growing collection of Bengali books on Indian Philosophy. Dr. Gourinath Sastri deserves to be congratulated for having persuaded the author to have it published under the Calcutta Sanskrit College Research Series.

HIRANMAY BANERJI

VEDA-MIMAMSA, Vol. II. By Anirvan. Royal quarto. Pp. 241-290.
Published by the Sanskrit College, Calcutta, 1965. Price Rs.250.

This is the second volume of an ambitious book to be completed in many more volumes, the object being to give a complete survey of the entire Vedic literature. The author has adopted a wide definition of the term by including in it not only the four different parts of Veda proper (Shiksha, Brahmana, Arangika and Upanishad) and the six Vedangas but also the two Mimamsas, Itihasa, Purana and Tantra as well.

The first volume was introductory in nature and consisted of only two chapters. The first chapter was confined to general introductory remarks. The second chapter gave a summary of the contents of the entire Vedic literature in the wide sense adopted by the author.

The present volume is devoted only to a part of the third chapter which deals with the Vedic gods who are thirty-three in number. It contains a general account of the Vedic gods followed by a detailed account of each specific god. The Vedic gods have been classified into three groups according to their location which may be the earth, the higher region known as *Dyaus* or the middle region known as *Antariksha*. The author has been able to deal in detail with only the gods of the earth region excluding earth itself which also is a member of this group. The pride of place, of course, goes to Agni which on account of the importance he enjoys among the Vedic gods has appropriated the major part of this chapter. The other gods are a group of eleven, known as the *Apri* gods. The present volume ends with them.

It is gratifying to note that the same fine quality observed before in respect of the first volume which had been revived in this journal previously has been maintained in this volume also. In fact it has been in some respects improved upon by supplementing quotations from texts with translation either in the substantive part of the volume or in the footnote.

HIRANMAY BANERJI

RESEARCH EFFORTS IN INDUSTRIAL ESTABLISHMENTS IN INDIA. By S. H. M. Husain, A. Ghosal and A. Rahman. Survey and Planning of Scientific Research Unit. Survey Report No. 5, C.S.I.R., New Delhi. Pp. 42.

The authors are to be congratulated for compiling and publishing the booklet 'Research Efforts in Industrial Establishments in India'. It is the first of its kind and more so valuable for future guidance to comprehensive publications. Much study and patient work have gone into it, involving evaluation of replies received to the questionnaires from parties concerned. Twenty-five Industrial Establishments have been considered—this by no means can be considered a very representative figure. I have no comments to make regarding the contents dealt with in chapters 1 to 5. Chapter

6 on foreign collaboration is very revealing. This shows how excessive has been our foreign exchange drain. This casts a reflection on the industrial policy of the Government and services rendered by C.S.I.R. Laboratories. Let development be a bit slower but more indigenous and self-supporting. All foreign collaborations and all 'Know How' have not been a cent per cent success. An appraisal in this regard is warranted. Our scientists and technologists must meet the challenge and create the 'Spirit of Swadeshi' in the industrial development of India.

P. RAY

ATHARVAVEDIYA PAIPPALĀDASAMHITĀ PRATHAMAKĀNDĀTMIKĀ. Edited by Durgamohan Bhattacharyya. Calcutta Sanskrit College Research Series No. XXVI, 1964. $6\frac{1}{2}'' \times 4''$. Pp. i-vi, 1-105.

The names atharvan, angiras and bhṛgu occur frequently in the R.V. to designate mythic personages, intimately connected with the production of the fire, and the soma-sacrifice; nowhere do they seem to refer to any kind of literary composition (R.V. X. 71, 11). The Atharvaveda is not used for solemn sacrifices and is very different from the other Vedas as it teaches expiatory, preservative, imprecatory rites as well as cosmogony and theology. The collection known as Atharvaveda was possibly compiled later but the germs of the correlation of the Atharvan and the Brahman as supervisor and corrector of the sacrifice connected with the 'trayī' may be traced to a period prior to the present reduction of Samhitās. For each Veda there are several Śākhās, and their differences arise from various readings. The rules, as they apply to the Śākhās of each Veda, have been taught by different sages under the title of 'Pratisākhyas' (cf. Someśvara's Tantra-vārttikātika). Thus Śākhās (branches) mean different traditional texts of the four Vedas. To take Śākhā either in the sense of 'a school' or of 'a portion of the Veda' would make Madhusūdana's words obscure. This realization may help a proper appreciation of the Paippalāda and other Śākhās of the Atharvaveda.

The Atharvaveda at one time existed in nine Śākhās of which the two most important are the Saunakiya and the Paippalāda. So far the text of the Saunaka-school was utilized by scholars for research and translations in addition to readings of the 'Cashmir text, the so-called Paippalāda-sākhā of the AV.' (Hymns of the Atharvaveda by M. Bloomfield, S.B.E., Vol. XLII, p. lxxiv.)

The discovery in Kashmir of a mutilated birch-bark MS. of the Atharvaveda of the Paippalāda-sākhā was due to Rudolf Roth who was deeply disappointed with the Saunakiya version. Professor Bhattacharyya's version of the First Kānda of the Paippalādasamhitā is based on the palm-leaf MSS. which he discovered in Jagannathpur and Mahantipur in Orissa, written in Oriya script, dating from A.D. 1656 to 1666. The MSS. are in good condition and Professor Bhattacharyya's editing and comparative study are constructive and useful.

The sufficiently exhaustive collectanea on the variants prove Professor Bhattacharyya's contention that the Oriya version comprises not only fuller but more reliable texts, cf. pp. xxi-xxxii. The initial verse *śam no devī* found in the Orissa MS. indicates that according to custom and analogy of the other Vedas and old literature, the Paippalādasamhitā was regarded as the standard Atharvaveda.

Professor Bhattacharyya's discovery has led to the following important and valuable results:

- (i) It has corrected the wrong impression that the Atharvaveda was closely associated only with Kashmir because of the

discovery of the garbled and corrupt Kashmiri Paippalāda—an impression held in spite of epigraphic and literary records to the contrary.

(ii) It has established the Paippalāda version as a living tradition in Orissa and Eastern India.

I may mention in this connection that the Atharvaveda was widely known in Mithila—*vide* Volume IV of A Descriptive Catalogue of Manuscripts in Mithila, edited by A. Banerji-Sastri, Vedic MSS., p. 10, No. 10.

(iii) Reconstruction of the original text of the Paippalādasamhitā and the mode of recitation from the still available oral demonstration of the Paippalāda Atharvavedins of Orissa. Fortunately the editor brought some tape-recording of recitations from Baripada.

Only the first of the twenty Kāndas has been published. All relevant data have been sifted critically and arranged scientifically by a man of extensive learning and of sound principles of criticism. His untimely death is a great loss to Vedic studies.

A. BANERJI-SASTRI

THE KAUTILYA ARTHĀŚĀSTRA. Parts II and III. By R. P. Kangle, M.A. Published by the University of Bombay, 1963 and 1965. 8½" × 6". Pp. 1-606 (Part II), 1-302 (Part III).

The project, as sponsored by the University of Bombay, consists of three parts: Part I containing a critical edition of the text with a glossary of important words, Part II giving an English translation of the text with explanatory notes and Part III envisaging a study of the problems connected with the *Arthaśāstra*.

After the text was printed as Part I, it was found that the Sanskrit Text in Part I and the English Translation in Part II did not agree; it was also noticed that there were misprints in the printed text. All these needed revision and the publication of Part I was apparently suspended.

Since its first publication in 1909, the *Arthaśāstra* has been translated into various languages of India and Europe. In preparing his translation in English, Professor Kangle has utilized many of these: in his Bibliography, he has included other titles 'not personally seen by me' (Part III, p. 2). In his attempt to get the correct sense of Sanskrit expressions, he has made use of commentaries, old and new, written in Sanskrit. Here, however, his study and reference are not exhaustive. For instance, he has utilized the *Pratipadapāñcikā*, a commentary on 2.8.5 to 2.36.47 by Bhāṭṭasvāmin, ed. K. P. Jayaswal and A. Banerji-Sastri, JBORS, XI (1925) and XII (1926)—*vide* Part III, Bibliography, Text and commentaries, pp. 285. He has evidently not seen the more complete and important *Arthaśāstravyākhyā Jayamangalā Bhikṣu Prabhāmativiracitā* in I-XII Adhyāyas, edited with critical notes in Sanskrit by A. Banerji-Sastri, the present reviewer, in *Samskrta-Saṅjivana-Patrikā*, Patna, Vasantapañcami, Sam. 1996.

Part III discusses the origin, nature and scope of the *Arthaśāstra* of Kautilya and its relation to the Dharmasāstras and Nitīśāstras. The writer has utilized most relevant materials, and his presentation is fair. The work is on the whole a critical study of the published works of others and constitutes a valuable contribution to the literature on the subject.

A. BANERJI-SASTRI

BHAGAT LAKSHMAN SINGH: AUTOBIOGRAPHY. Edited by Ganda Singh. Published by the Sikh Cultural Centre, Calcutta, 1965. Pp. i-xiii, xiv-xix, 1-323. 7½" × 5½".

This autobiography will help the reader to visualize the eighty-year period (1862-1942) of the history of the Punjab with particular reference to the socio-religious movements that affected the thought and life not only of Northern India but also of other parts of the country.

In this epoch of renaissance and reform in India, the inter-relations and activities of the Aryasamaj, the Brahmosamaj, Khalsa Diwan, Sikh Gurdwara Reform Movement and the Christian Missions are described in quite a personal and distinctive manner. His acquaintance with Swami Dayanand, with Pratap Chandra Mozoomdar, editor and author of 'The Life and Teachings of Keshub Chunder Sen' (1838-1884), and with Mr. Macauliffe enabled him to form individual impressions which ripened into abiding convictions. His original friendship with Aryasamaj and Brahmosamaj leaders cooled. Sikhs seceded from Aryasamaj and there was schism in Brahmosamaj. Educated in the American Mission School, Rawalpindi, and Government College, Lahore, he had great admiration for the foreign Christian missionaries, particularly Americans. He was grateful to them for their devotion to reform and education and the social and political awakening in the masses that came in their wake. To appreciate this attitude it is necessary to remember that the foreign Christian missionaries were among the first to light the torch of renaissance in India by the introduction of Western Scientific Knowledge through the printing press and printed books imported from abroad.

Bhagatji finished his autobiography in 1942. Regarding the problems of the Punjab, these are his last words :

'In conclusion I would like to say that this so-called separatist movement of the Sikhs is responsible for the establishment of any number of educational institutions and colleges, orphanages and other public institutions for the recognition of the Sikh community as an independent political entity both by the rival communities and by the Government' (p. 296). Bhagat Lakshman Singh has a forthright and forceful style, sometimes to the detriment of a dispassionate assess of the issues involved. He often seems to ignore the possibility of an alternative point of view.

A. BANERJI-SASTRI

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